



LEADING IN THE **DIGITAL WORLD**: OPPORTUNITIES FOR **CANADA'S MEMORY INSTITUTIONS**

The Expert Panel on Memory Institutions
and the Digital Revolution



Council of Canadian Academies
Conseil des académies canadiennes

Science Advice in the Public Interest

**LEADING IN THE DIGITAL WORLD: OPPORTUNITIES
FOR CANADA'S MEMORY INSTITUTIONS**

The Expert Panel on Memory Institutions and the Digital Revolution

THE COUNCIL OF CANADIAN ACADEMIES

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Message from the Chair

As an exercise, identifying the best opportunities for memory institutions at a time of rapid technological and social change is inevitably fraught with uncertainty. What is possible and promising now could be completely undermined by unforeseen developments in the near future. This, however, is what the Expert Panel on Memory Institutions and the Digital Revolution was tasked to do, and for good reason. Memory institutions and other organizations that find themselves on the front lines of digital change must continuously determine which opportunities warrant investment regardless of the uncertainty.

As challenging as it is to identify the best opportunities amid a digital revolution, the Expert Panel, comprised of leading experts from a broad range of disciplines, had the advantage of having the time to engage with one another in rigorous and insightful deliberations over the course of a year. The result has been very encouraging. Indeed, though it became clear that memory institutions must step up to the challenges of the digital age lest they become culturally obsolete, the benefits of doing so are significant. It also became clear that, in the digital age, the commonalities among memory institutions are now outweighing the differences. Thus, while important distinctions remain, memory institutions collectively share many fundamental problems, the solutions to which require that they work together across sectors to deliver what Canadians now expect.

It has been a pleasure and privilege to chair this Panel. I am very grateful to my colleagues on the Panel who contributed their time and effort to ensure the depth and quality of the report. We hope the resulting effort will be useful in helping inform the decision-making and policies of memory institutions as they navigate the myriad of digital opportunities and related challenges.

On behalf of the Expert Panel, I thank Library and Archives Canada and Treasury Board Secretariat of Canada for asking the Council to undertake this assessment, and the expert peer reviewers who set aside the time to critique the report and help ensure its comprehensiveness, accuracy, and balance. I would also like to extend my thanks to the Council's project team for its excellent work and support throughout the assessment. And, not least, special thanks to Heather Gordon for organizing an informative tour of the City of Vancouver Archives.

A handwritten signature in black ink, appearing to read "Doug Owram". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Doug Owram, FRSC

Chair, Expert Panel on Memory Institutions and the Digital Revolution

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Report Review

This report was reviewed in draft form by the individuals listed below — a group of reviewers selected by the Council of Canadian Academies for their diverse perspectives, areas of expertise, and broad representation of academic, industrial, policy, and non-governmental organizations.

The reviewers assessed the objectivity and quality of the report. Their submissions — which will remain confidential — were considered in full by the Panel, and many of their suggestions were incorporated into the report. They were not asked to endorse the conclusions, nor did they see the final draft of the report before its release. Responsibility for the final content of this report rests entirely with the authoring Panel and the Council.

The Council wishes to thank the following individuals for their review of this report:

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The report review procedure was monitored on behalf of the Council's Board of Governors and Scientific Advisory Committee by **Margaret Conrad, O.C., FRSC**, Professor Emerita, Department of History, University of New Brunswick (Fredericton, NB). The role of the Report Review Monitor is to ensure that the Panel gives full and fair consideration to the submissions of the report reviewers. The Board of the Council authorizes public release of an expert panel report only after the Report Review Monitor confirms that the Council's report review requirements have been satisfied. The Council thanks Professor Conrad for her diligent contribution as Report Review Monitor.

Executive Summary

Canada is now a digital society. Decades of evolving digital technologies have changed how we interact, the amount of cultural content we create and exchange, and the methods we use to create and exchange this content. This reality has profoundly affected the established ways in which memory institutions, such as libraries, archives, museums, and galleries, have been managing Canada's documentary heritage for future generations. Indeed, the sheer volume of digital content necessitates new ways of locating, maintaining, and accessing digital holdings that must coexist alongside the continued need for the preservation of non-digital content.

To help better understand and navigate this period of change, Library and Archives Canada asked the Council of Canadian Academies (the Council) to undertake an assessment of memory institutions in the digital age to answer the following question:

How might memory institutions embrace the opportunities and challenges posed by the changing ways in which Canadians are communicating and working in the digital age?

Additional direction was provided in four sub-questions:

- *With the use of new communication technologies, what types of records are being created and how are decisions being documented?*
- *How is information being safeguarded for usefulness in the immediate to mid-term across technologies considering the major changes that are occurring?*
- *How are memory institutions addressing issues posed by new technologies regarding their traditional roles in assigning value, respecting rights, and assuring authenticity and reliability?*
- *How can memory institutions remain relevant as a trusted source of continuing information by taking advantage of the collaborative opportunities presented by new social media?*

To address these questions, the Council appointed a multidisciplinary expert panel (the Panel) with expertise in archiving, history, digital humanities, management of memory institutions, digital technologies as they relate to cultural content, and law. In preparing the report, the Panel drew upon evidence from a wide range of traditional and non-traditional sources with the goal of

providing guidance to decision-makers concerned with the long-term success of Canadian memory institutions, both large and small. To encompass the range of new practices and services at the leading edge of a rapidly moving digital frontier, the Panel used non-traditional sources of information documented in specialized blogs and other social media to complement peer-reviewed literature. International examples from countries whose memory institutions have been at the forefront of adapting to the digital landscape were also valuable.

MAIN FINDINGS

To keep pace with the fundamental and unavoidable digital change now reshaping society, Canada's memory institutions must exercise their capacity to be leaders.

Effective institutional leadership that embraces the digital society and its opportunities can help guide change in all aspects of memory institutions' operations, both technical and managerial. Without such leadership, the digital challenges will only get bigger. While digital strategies will vary by institution, the response to the digital world must be fully integrated into management decisions in all cases.

Facilitating the change requires an integration of human resource capabilities, bringing together established disciplinary knowledge and expertise with technical skills and legal knowledge, and a substantial refocus of resources to ensure positive digital outcomes. At a time of limited resources, digital priorities invariably compete with other corporate functions. All memory institutions can benefit from a significant rebalancing of these resources, one that recognizes the importance of digital initiatives and how they can augment other corporate functions.

Many of the challenges that memory institutions face as they attempt to adapt to the digital age are rooted in technical issues associated with managing digital content, the sheer volume of digital information, and the struggle to remain relevant.

Although the digital environment creates some new challenges for memory institutions, many of the challenges relevant to non-digital materials are amplified in the digital world for the following reasons:

- *Technical challenges* — Unlike non-digital material, digital entities can only be experienced when they are processed by technology, which becomes obsolete quickly. Memory institutions are challenged with preserving files in formats that will remain accessible over the long term. Technical challenges have important legal ramifications for archives, since they are trusted to preserve records that may be used in lawsuits, human rights inquiries, and other investigations.
- *Volume of information* — For archives in particular, deciding which records to preserve is made more difficult by the growing amount of material to appraise, including content created by the public using web-based tools such as blogs and YouTube.
- *Relevance* — Users now expect information to be available from online search engines such as Google. Thus memory institutions are becoming increasingly aware that they are not central web destinations for information seekers. The copyright laws that memory institutions must follow in their daily activities are not always relevant for the digital age.

While these challenges may appear daunting, memory institutions can take advantage of the opportunities created by the digital age. Cultural shifts and technical advantages can also help memory institutions adapt to the digital environment and maintain relevance.

The digital world has the potential to fundamentally change the relationship between memory institutions and people for the better. The integration of a participatory culture into the daily operations of memory institutions will ensure that they establish a sustainable, authentic relationship with the public.

New technologies are allowing memory institutions to redefine their relationship with users in ways that increase their participation and engagement in a range of institutional activities related to documentary heritage. If done successfully, the Canadian cultural landscape can be transformed in important ways. By establishing meaningful relationships that foster trust between institutions and users, memory institutions can leverage both skilled and non-skilled input from citizens while providing them with enhanced and valued experience.

Building relationships is especially important for memory institutions that steward Aboriginal cultural heritage and archival records. Meaningful collaborations between Aboriginal communities and museums aimed at increasing digital access to, and engagement with, cultural heritage may play a role in broader efforts at reconciliation.

Memory institutions are beginning to realize that digital projects, which may be national or even international, must establish firm roots in the community in order to succeed. For example, the Digital Public Library of America (DPLA) manages a project that involves training local librarians in digital technologies. The librarians will use their new skills to help community members digitize their personal materials, thereby enriching DPLA holdings with local content.

Once memory institutions forge relationships with community members, they can more easily engage citizens in various participatory projects. These projects benefit both the institutions (e.g., by enhancing the content or descriptive data of collections) and the public (e.g., by providing them with unique experiences). Dedicated expert volunteers may even design software programs that enhance the day-to-day functions of memory institutions or create innovative applications that encourage further input from the public.

Collaboration is essential for adaptation. It allows memory institutions to access resources vital for delivering enhanced services that users now expect in the digital age.

Through collaboration, memory institutions can access the breadth of knowledge, skills, and technical infrastructure that underpin both core and specialized services. This allows them to carry out their main functions much more efficiently. For example, collaboration can make core services more convenient for users, reduce the workload for individual institutions, and increase standardization of policies and digital platforms.

In addition to accomplishing these more practical goals, collaboration can provide unique opportunities for the public that would not be possible if memory institutions acted alone. Through collaborations with private companies and academia, memory institutions can become involved in exciting activities that enhance their visibility and undertake large projects that require additional resources. Memory institutions can cultivate trusting relationships and create rewarding experiences for both themselves and their diverse users by collaborating with various communities. These relationships can pave the way for future collaborations and engagement in participatory opportunities. An integral concept for the success of many of these collaborative strategies is openness.

Knowledge sharing, innovation, and further collaboration are enabled when programmers make their software open source and when memory institutions release data under open licences. Countries that have provided cultural data to their citizens and encouraged reuse of data through activities such as contests have demonstrated the benefits of this approach.

For collaborations to be successful, however, memory institutions must be conscious of the need to manage reputational and other risks associated with collaborations and to gain proper credit for their role and contribution.

BENEFITS OF BEING DIGITAL

The digital opportunities of today demand collaboration and information sharing. In lowering barriers to collaboration and enabling more complex services, digital technologies provide memory institutions with an exceptional opportunity to engage a wider set of culturally relevant, but geographically dispersed, communities. Memory institutions would benefit by becoming more vocal participants in the current national debate on digital infrastructure, given its potential to support the acquisition and preservation of digital heritage. Such participation would ensure that their needs, along with those of the wider public, are represented.

Leading digitally is also about keeping pace with expectations. In all facets of our lives, we expect citizen-centric services to seamlessly interact with how we use and access digital material and information every day. If documentary heritage is to be used in the shaping of Canada's culture, it must be digitally discoverable and accessible. Expanding presence in these digital spaces is therefore important for future relevance.

Canada's memory institutions are historically contingent: Library and Archives Canada dates back to the establishment of the Dominion Archives in 1872 and the National Library of Canada in 1953. The digital environment of the 21st century is a different time and place. Despite the recognized limitations and responsibilities of governments and institutions, the internet, a worldwide repository of documentary material, is fast becoming its own archive. In the past, we could only read one book at a time. Today, we can use machines to "read" millions of books, examine thousands of artefacts, or wade through a myriad of records at once. New understandings and interpretations will emerge from these new ways of accessing information. It is an exciting moment, and Canada's memory institutions have an opportunity to show leadership and shape the way in which we remember, now and in the future.

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1

Introduction

- **The Charge to the Panel**
- **Why Memory Institutions Matter**
- **Memory Institutions as a Focal Point**
- **Differentiating Between Memory Institutions**
- **The Canadian Landscape of Memory Institutions**
- **Approach and Methodology**
- **The Structure of the Report**

1 Introduction

Canada's memory institutions¹ face unprecedented challenges in the digital age. Although society continues to produce physical materials, it is now also generating a seemingly infinite amount of information online, all of which is being maintained, accessed, and used in new ways. While a great deal of "born digital"² material is intended to be kept for continuing and future use, its sheer volume creates novel challenges for institutions whose mandate is its long-term preservation. These challenges are made more acute by their appearance in a time of fiscal restraint, when institutions at federal, provincial, and municipal levels are already coping with budget limitations. Consequently, libraries, archives, museums, galleries, and other memory institutions must rethink and change many aspects of their operations related to identifying, acquiring, organizing, describing, preserving, and disseminating digital and non-digital cultural heritage.

Though these challenges push and pull memory institutions in different directions to fulfil their respective mandates, they also offer significant opportunities that have the potential to make them more accessible, valuable, and ultimately more relevant. Canadians can benefit from having their memory institutions embrace these opportunities, even if their scale, cost, and complexity can deter their implementation. Realizing these opportunities, therefore, requires openness to innovation, partnerships, and resource sharing, and a willingness to become more focused on user communities. At the same time, to meet the new challenges, memory institutions must continue to honour their responsibilities towards the materials in traditional form that they either already hold or have a continuing mandate to acquire because these materials are the heritage of Canada and the world.

1 The collective term for these institutions varies. Acronyms such as LAM (Libraries, Archives and Museums) or GLAM (Galleries, Libraries, Archives and Museums) are common. This report uses the term *memory institutions* for the sake of consistency. Hjørland (2000), who borrowed the term from a 1994 publication by Swedish information scientist R. Hjerpe, posited that the division of labour that has long existed between the variety of institutions responsible for printed documents (that is, memory institutions) would need to change as they came to use the same basic medium of communication.

2 *Born digital* (also called *native digital*) content refers to content that was originally created in a digital format, so there is no analogue or physical original. The other source of digital information is content converted to a digital format from non-digital materials (such as books, other physical objects, and analogue data) (Ronchi, 2009; Conway, 2010). Digital preservation prolongs the existence and protects the integrity of any digital information, regardless of its source (Duranti, 2010).

Memory institutions in Canada have already begun to adapt to the demands of the digital environment, albeit to varying degrees. This assessment is intended to further guide such efforts by providing an in-depth analysis of the main opportunities offered by the use of digital technology. In the digital age, memory institutions are called on to adapt to maintain their relevance and value to Canadians; they can no longer be self-sufficient (in knowledge and resources) when it comes to providing the comprehensive digital services that the public now expects.

1.1 THE CHARGE TO THE PANEL

To help guide memory institutions in this period of major change, Library and Archives Canada (the Sponsor), with support from the Treasury Board Secretariat of Canada, asked the Council of Canadian Academies (the Council) to undertake an expert panel assessment that brings together the best available evidence and information on the challenges and opportunities for memory institutions in the digital age.

Specifically, the Sponsor asked the following question:

How might memory institutions embrace the opportunities and challenges posed by the changing ways in which Canadians are communicating and working in the digital age?

The Sponsor also posed four additional questions:

- *With the use of new communication technologies, what types of records are being created and how are decisions being documented?*
- *How is information being safeguarded for usefulness in the immediate to mid-term across technologies considering the major changes that are occurring?*
- *How are memory institutions addressing issues posed by new technologies regarding their traditional roles in assigning value, respecting rights, and assuring authenticity and reliability?*
- *How can memory institutions remain relevant as a trusted source of continuing information by taking advantage of the collaborative opportunities presented by new social media?*

1.2 WHY MEMORY INSTITUTIONS MATTER

Memory institutions are a window to the past. Through stories, physical objects, records, and other documentary heritage, they provide Canadians with a sense of history, a sense of place, a sense of identity, and a feeling of connectedness — who we are as a people. These are *our* institutions, holding material accumulated for the benefit of people living in Canada. They enable one generation to speak to another and, in doing so, provide much-needed insight into the past.

Memory institutions are also essential to the integrity and vitality of Canadian democracy. The materials in them hold us to our values and nourish our debates on civil society. By ensuring preservation, authenticity, and access to their holdings (subject to certain restrictions, such as people's privacy), memory institutions help guarantee transparency and accountability. Indeed, authentic records and their availability are at the heart of civil governance. Archives in particular are essential for addressing human rights concerns, often because these concerns are not identified until well after an injustice has occurred (Nesmith, 2014). Authentic historical records, for example, were vital for initiating formal apologies for past mistreatment of Canadians of Japanese, Chinese, and Ukrainian origin (Wilson, 2014). Archives have also been instrumental in supporting inquiries into wrongs against Aboriginal peoples in Canada, including the trauma caused by residential schools. In 2013, Canadian historian Ian Mosby published a paper describing the exploitative nutritional research that was conducted with children attending these schools, which he revealed by searching through federal records on nutrition policies (Mosby, 2013; Shuchman, 2013). The paper received international media attention and led to a day of protest by First Nations across Canada (Mosby, 2014).

Archives are also important for documenting the accomplishments, milestones, and contributions of a nation. Library and Archives Canada (LAC), for example, has an extensive collection of military material, which includes a database of medals, honours, and awards from 1812 to 1969 and various records from the First and Second World Wars (LAC, 2014a). As part of the Government of Canada's centennial commemoration of the First World War, LAC is digitizing 640,000 Canadian Expeditionary Force personnel service files and making them freely available through its website (LAC, 2014b).

For Canadians, memory institutions are also instruments of enjoyment. An in-depth national survey completed in 2008, *Canadians and Their Pasts* — the most recent and comprehensive study of its kind — concludes that Canadians “are profoundly interested in the histories of their families and the larger groups to which they belong” (Conrad *et al.*, 2013). Canadians are highly engaged with history regardless of how old or new the historical source. Whether the past is conveyed by a historical site, a physical artefact, or a film or video game, Conrad *et al.* (2013) find that Canadians “draw upon impressions gathered from a myriad of sources to construct their multiple versions of imagined communities” and remind us that everyone “embodies [...] beliefs and assumptions based on interpretations of the past.”

The past, in short, is in our art and media, in our family heirlooms, in street names and architecture, and in religious liturgy and school textbooks, all of which suggest that it matters to Canadians from all walks of life (Conrad *et al.*, 2013). And while Canadians are tremendously fascinated by family history, interest in national, civic, ethnic, or religious history remains strong and facilitates a sense of citizen engagement with the past (see Table 1.1). Indeed, there is an emotional component to history that makes it valuable and indispensable. In the *Canadians and Their Pasts* survey, researchers note that “the thrill of actually standing on the spot where historical events occurred was conveyed by a number of respondents,” which creates a sense of awe and emotional connection resulting from being “right there” (Conrad *et al.*, 2013). This powerful emotion has been called “a moment of heritage,” which deeply touches people in their own *present* moment and creates a link to the past — the kind of link that memory institutions are mandated to preserve and promote.

Canadians value memory institutions not only for their association with history but also for the role they play in fostering education and lifelong learning. Libraries and museums frequently support schools through learning collaborations, while many university libraries hold and make historical documents, film, images, and entire archives available to students. From K-12 field trips to museums of natural history, to online digitized collections made freely available by national art galleries and archives, memory institutions have traditionally supported formal educators as well as curious individuals seeking to expand their knowledge.

Canadians also believe memory institutions are trustworthy sources of information and evidence. In the 2008 survey, museums in particular were identified as being “very trustworthy” by more than 60% of survey respondents (Conrad *et al.*, 2013). Even those who lack awareness of the role of Canada's memory institutions, however, glean the significance of preserving our national heritage. According to a 2005 Ipsos Reid poll conducted for LAC, 95% of Canadians feel “it is important that Canada's documentary heritage is preserved for future generations” (Ipsos-Reid Corporation, 2005). In an address to the Canadian Archives Summit, Jedwab (2014) pointed out that this response was overwhelming even among those Canadians who had never heard of LAC.

Table 1.1

Engaging with the Past: Participation Rates Over a 12-Month Period, 2007

Activity	Percentage of Canadians
Looked at old photographs	83
Watched movies, videos, DVDs, or TV programs about the past	78
Kept something meaningful to pass on (heirlooms)	74
Visited a place from a family's past	57
Prepared a family scrapbook, or involved in other activities to preserve the past	56
Read books about the past	53
Visited a historic site	49
Visited a museum	43
Used the internet to look up or post information about the past	40
Done any other activities related to the past	25
Worked on [a] family tree/completed genealogical research	20
Written or visited a public archive	15
Played video or computer history games	8

Reproduced with permission from Conrad *et al.* (2013)

This table lists responses from the Canadians and Their Pasts survey, conducted by the Institute for Social Research at York University between 2007 and 2008. Participants were asked about their level of engagement with the past over the course of the last year. The survey was based on a sample of 3,119 respondents.

1.3 MEMORY INSTITUTIONS AS A FOCAL POINT

The collective term *memory institution* gained traction as more and more information converged online, further blurring the distinctions between archives, libraries, galleries, and museums. Its use has been reinforced by information seekers, who are indifferent to where information comes from, as long as they find it (Hedegaard, 2004). While archives, libraries, and museums each have “quite different traditions of documentation and organization,” they share a common goal, namely “the preservation and presentation of cultural heritage (including natural history)” (Kirchhoff *et al.*, 2008).

Dempsey (1999) argues that there are certain essential commonalities among memory institutions:

Archives, libraries and museums are memory institutions: they organise the [...] cultural and intellectual record. Their collections contain the memory of peoples, communities, institutions and individuals, the scientific and cultural heritage, and the products throughout time of our imagination, craft and learning. They join us to our ancestors and are our legacy to future generations.

This vision articulates a role for memory institutions that goes beyond the mandates of any one of its constituents, at least in Canada. It effectively pushes the boundaries of cultural heritage as publications, records, and artefacts, and is in line with a growing recognition of the need for a broader encapsulation of *culture* that includes the intangible, as espoused by UNESCO’s *Convention for the Safeguarding of Intangible Cultural Heritage*. In this Convention, *intangible cultural heritage* is defined as “the practices, representations, expressions, knowledge, skills — as well as the instruments, objects, artefacts and cultural spaces associated therewith — that communities, groups and, in some cases, individuals recognize as part of their cultural heritage” (UNESCO, 2003b). *Memory institutions* as a term, in short, evokes the idea of an institution or set of institutions fully equipped to preserve heritage in all its tangible and intangible dimensions, embracing new digital technologies to meet these ends.

1.4 DIFFERENTIATING BETWEEN MEMORY INSTITUTIONS

The Panel assumes that all memory institutions are involved in retaining a record of the past in some form (e.g., art, artefacts, publications, documents), and share some common challenges and opportunities in their societal role as collectors and preservers of cultural heritage in the digital age. Because they vary in type, size, and mandate, however, the opportunities identified by the Panel may not be universally applicable or accessible. Understanding this

diversity is important for identifying the potential opportunities for individual institutions, for memory institutions as a whole, and for society in general. Memory institutions will respond differently to the challenges and opportunities offered by the digital environment.

According to the Panel, the differences are of two kinds: scale and type. Scale is fairly straightforward, but important. As Section 1.5 shows, memory institutions in Canada run the gamut from large-scale, complex organizations with more than 500 employees (and a variety of specializations and financial resources) to small units seeking to meet changing demands with scarcity of equipment and staff. Differences in type — archives, libraries, and museums — are as important as differences in scale. Memory institutions may have a common responsibility as preservers of cultural heritage, but their societal roles and interactions with the digital environment are distinct.

Government archives, in particular, are required by law to keep government records that they select for permanent preservation for their enduring administrative or legal value or as evidence of past actions and events. In addition, according to the *Library and Archives Canada Act*, “no government or ministerial record [...] shall be disposed of, including by being destroyed, without the written consent of the Librarian and Archivist or of a person to whom the Librarian and Archivist has, in writing, delegated the power to give such consents” (GOC, 2012a). This is because governments are held accountable for their actions through their records, and public records are essential for documenting the rights and obligations of individuals and corporations in society. For example, land claims and class action lawsuits are often based on records held by the archives (Wilson, 2014). The varied uses of archival holdings are discussed further in Section 3.1.5.

It is the Panel's view that, because their operations are regulated by a variety of statutes, government archives are not as flexible as non-governmental institutions in terms of the contracts they can enter into, the funding sources they can accept, and the methods by which they can communicate with the public. Non-governmental archives are also limited by the policies and procedures of the creators of the records they hold, as well as government statutes. For example, the archives of a university, a crown corporation, or even a museum preserve the documentary evidence of the actions and transactions of their institutions according to requirements that may be established by external sources (e.g., for legal records, personnel records, financial records) or by their own institution. In addition, the way records are maintained and made accessible, as well as the means of doing so (e.g., outsourcing, acquisition of digital tools), must be consistent with the institutional policies and procedures.

Furthermore, in contrast to archives, libraries and museums have more choice regarding the scope of their collections. For example, a museum may be focused on a particular culture or a library may have an interest in acquiring the complete collection of a specific author. While archives hold primary sources of evidence, protecting their identity and integrity so that they can be “mined, interpreted and manipulated by scholars, governments and other external users” (Robinson, 2012), museum curators choose and interpret cultural material to produce meanings and histories. In comparison to museums and archives, libraries have been more focused on developing methods for classifying, organizing, and cataloguing information to facilitate easier access to material by members of the public (Robinson, 2012).

1.5 THE CANADIAN LANDSCAPE OF MEMORY INSTITUTIONS

Canada’s heritage is distributed across a complex multilevel landscape of memory institutions that vary by type, size, resources, and jurisdiction. This landscape includes the local municipal libraries that cater to communities, provincial archives whose main role is to preserve provincial government and private-sector records, and national museums that serve all Canadians. It includes informal heritage associations and cultural communities whose volunteers work to document local or regional cultures, and an assortment of private-sector organizations catering to local, national, or global markets, which may operate as repositories and distributors of Canadian cultural content, such as scholarly journal articles and social media content.

Within this landscape, there is a core set of institutions, as discussed above, formally legislated with a mandate to preserve Canadian heritage. These are typically the larger public archives, libraries, museums, and galleries established under federal and provincial legislative acts, which have traditionally been seen by the public as trusted sources of knowledge and essential pillars for a cohesive society (Usherwood *et al.*, 2005). In the case of archives, there are legislative differences among the provincial statutes that dictate which records are retained by provincial archives. Some focus most heavily on government records but also cover in part the private sector (e.g., Ontario) (Government of Ontario, 2011a). Others maintain more of a balance between public and private records (e.g., Quebec). Under the *Archives Act* in Quebec, the Bibliothèque et Archives nationales du Québec manages the documents of all public bodies, which include not only the government, but also the courts, school boards, public health services, and other public institutions (Gouvernement du Québec, 2012). This inclusive mandate helps to drive standardization in recordkeeping.

Among the most prominent of these institutions are LAC and Canada's national museums. LAC has an explicit mandate to acquire and preserve the records of the federal government as well as Canadian documentary heritage from the private sector (GOC, 2012a). The national museums are tasked with playing "an essential role, individually and together with other museums and like institutions, in preserving and promoting the heritage of Canada and all its peoples throughout Canada and abroad and in contributing to the collective memory and sense of identity of all Canadians" (GOC, 2013b).

Figure 1.1 shows the diversity of organizations that make up the Canadian heritage landscape. At the centre are the formal memory institutions — the libraries, archives, public galleries, and museums. To the left are associative groups and organizations that are directly involved in heritage preservation, and to the right are various private-sector groups directly and indirectly associated with heritage preservation.

Though the memory institutions identified in the centre of Figure 1.1 are the focal point for this assessment, the broader set of actors also plays a critical role in preserving Canadian heritage. This was recognized back in 1951, when the Massey Commission stated:

It is impossible to separate national from local and provincial history. The local archival collection, whether provincial, municipal or private, is an essential factor in the effectiveness of the national institution: first, because of the source of materials which it contains; second, because through its functions it serves as an agent in gathering and preserving, no matter where, materials that might otherwise be destroyed; and third, because [of] its existence and its services.

(Massey Commission, 1951)

The significance of this wider set of actors is also reflected in the numbers. Canada has over 1,400 public-sector establishments recognized as archives, libraries, art galleries, or history and science museums, all of which maintain a payroll (Table 1.2). This number does not include private-sector or informal volunteer organizations that may be active in this space. Canada's archival system alone, for example, is estimated to comprise about 800 institutions of various types (LAC, 2010). For example, in Ontario, the system includes such organizations as the Anglican Church of Canada (General Synod Archives), the Burlington Historical Society, the Law Society of Upper Canada Archives, the Thomas Fisher Rare Book Library at the University of Toronto, and the

Waterloo Region Museum, which first opened in 1957 as the Doon Pioneer Village (Archeion, n.d.). These types of organizations are operating in all provinces and are a key part of the broader memory institution landscape.



Figure 1.1
Memory Institution Landscape in Canada

The figure shows the diversity of institutions, organizations, and other actors that are involved in the preservation of cultural heritage. It differentiates a core set of public memory institutions (at the centre) from private-sector organizations (middle right) whose roles range from preservation of specialized kinds of heritage to support services for the public memory institutions. It also differentiates the core set of institutions from associations (middle left), which play important roles in sharing of knowledge and best practices and in preservation of heritage. Finally, the figure recognizes the public, both Canadian and international, in the outer ring, for its growing role as demanding users, contributors, and volunteers in core activities.

Though significant in number, most memory institutions are small in size. Indeed, as shown in Table 1.2, the majority of memory institutions are very small, with three-quarters having nine or fewer employees. Just under 2% have more than 200 employees.

Table 1.2
Size of Formal Memory Institutions in Canada, 2013

Number of Employees	Archives	History and Science Museums	Libraries	Art Galleries	Total	Percentage
1 to 4	51	56	644	105	856	58.3
5 to 9	20	47	164	41	272	18.5
10 to 19	6	40	72	30	148	10.1
20 to 49	4	25	56	16	101	6.9
50 to 99	2	10	28	4	44	3.0
100 to 199		10	13	1	24	1.6
200 to 499		4	13	3	20	1.4
500+	1		2	1	4	0.3
Total	84	192	992	201	1,469	100

Data Source: SC (2013b)

The table shows the number of archives, libraries, history and science museums, and art galleries in Canada, by employment. It underscores the fact that the majority of memory institutions are small, with over three-quarters having fewer than 10 employees. The data represent active locations that maintain a payroll for four NAICS codes — 519121 (Libraries), 519122 (Archives), 712111 (Non-commercial art museums and galleries), and 712115 (History and science museums) — and are therefore not inclusive of all of Canada's memory institutions.

1.5.1 International Players

A growing number of international groups are joining memory institutions in the effort to digitally preserve cultural heritage. The World Heritage Memory Net, for example, advertises itself as “a model global digital library of cultural, historical, and heritage collections related to the current 981 World Heritage Sites [...] inscribed by the UNESCO World Heritage Committee” (WHMNet, 2011). UNESCO is also important for its international conventions related to the digital age. In 2003, UNESCO adopted its *Charter on the Preservation of Digital Heritage*, which recognizes the importance of preserving the world's digital heritage and urges signatories to adopt legal measures safeguarding digital heritage and ensuring reasonable public access to the deposited heritage material (UNESCO, 2004; Sheppard, 2012). UNESCO reiterated this commitment in

its 2012 *Vancouver Declaration* (UNESCO, 2012). (Canada, it should be noted, is not a signatory of UNESCO's *Convention for the Safeguarding of the Intangible Cultural Heritage* or its *Charter on the Preservation of Digital Heritage*.)

Non-profit organizations are also contributing to digital preservation. For example, the Internet Archive was founded in 1996 to offer “permanent access for researchers, historians, scholars, people with disabilities, and the general public to historical collections that exist in digital format” (Internet Archive, n.d.). On the corporate side is the Google Cultural Institute, the result of Google partnering “with hundreds of museums, cultural institutions, and archives to host the world’s cultural treasures online” (Google Cultural Institute, 2013). Google has been able to make available more than 40,000 high-resolution images of works, including paintings, drawings, sculptures, historic photographs, and important manuscripts. Other examples include the International Children’s Digital Library and the World Digital Library, also supported by UNESCO, to which over 170 partner libraries and archives from around the world have contributed content (WDL, 2014).

1.5.2 The Public’s Role in the Cultural Heritage Landscape

The public, both Canadian and international, plays an increasingly important role in contributing to the preservation of Canadian cultural heritage by participating as volunteers, helping identify and contextualize digitally preserved items, or engaging in appraisals via the internet (Cook, 2011). In 2008, Heritage Canada estimated that approximately 55,000 volunteers worked on location in Canadian museums (GOC, 2008b).

In addition to having rights to its public institutions, the public also comprises demanding customers, who continuously call for new and different services (Marty, 2011; Marty & Kazmer, 2011). People no longer expect just to acquire knowledge from the resources preserved by memory institutions; they also expect a unique experience.

1.5.3 Non-Traditional Memory Institutions

There are a growing number of movements, groups, and organizations, especially in the area of research, that are not generally recognized as memory institutions but that nonetheless share similar interests to libraries, archives, and museums and face similar issues related to preserving digital heritage.

Canada’s research system, for example, is affected not only by the fact that much of the scholarly record now exists only in digital form but also by the open access movement and changes in research policy (GOC, 2014a; LCDI, 2014). The open access movement, which affects policy in Canada (NSERC, 2014)

and the United States (Stebbins, 2013), helps ensure that results from publicly funded research are freely accessible after a certain period of time, and that data are retained and shared (Shearer, 2011). A 2008 Research Data Strategy Working Group explored the establishment of a system for stewarding research data. The group determined that such a system would only be possible in Canada “if sound preservation practices are followed [including] appraising, selecting, depositing or ingesting data into a repository, ensuring authenticity, managing the collection of data and metadata, refreshing digital media, and migrating data to new digital media” (GOC, 2008a).

Amid these trends, the infrastructure needed to store and share publications has been growing. At least 90 digital repositories in Canada, set up by university libraries and research institutes, hold research data and publications (Open Access Map, n.d.). Although few of these repositories have full preservation capacity (Shearer, 2011), they represent new entities in the wider memory institution landscape.

With the rise of big data science, this wider digital infrastructure landscape is likely to become more significant. The National Research Council's Canadian Astronomy Data Centre (CADC), for example, is now storing and providing access to very large datasets — over 400 terabytes of data. And though CADC does not have a mandate for the long-term preservation of data, it is acting as an archives for a number of national and international observatories, including the Hubble Space Telescope (Schade, 2010; CADC, 2014). Canada's 28 high-performance computing facilities, which serve the research community at universities and hospitals through the Compute Canada network, are also significant on this front (Compute Canada, 2011). Indeed, because “large experiments and instruments such as ATLAS and the SKA are generating or will generate petabytes to 100s of petabytes of data” (Compute Canada, 2010), the provision of data storage and the management and preservation of large datasets are becoming a growing priority for Compute Canada.

1.5.4 Governance of Canada's Memory Institutions

Canada's memory institutions operate largely in an uncoordinated manner. There are no formal networks that bring together all of the institutions under any one banner. Instead, clusters of coordination exist across the different types of institutions and by region, structured through more than 50 associations and networks (see Table 6.3).

A number of these organizations are playing increasingly central roles in addressing digital challenges in their respective institutional communities. The Canadian Association of Research Libraries (CARL), for example, which

provides organized leadership for the Canadian research library community, has been working towards the realization of a national research library resource-sharing network in the areas of collection development, preservation, and access (CARL, 2014b). The Ontario Council of University Libraries has established Scholars Portal, a technological infrastructure for preserving and providing access to digital information resources shared among 21 universities in Ontario (OCUL, 2013). Another group is the Canadian Research Knowledge Network, which was established to coordinate the leadership of stakeholders in the research community and to build knowledge infrastructure for Canada's universities by acquiring, on a large scale, electronic content from publishers (CRKN, 2013). The Council of Canadian Archives (CCA) was established in 1985 to provide coordination across the archival system, identify national priorities, advise the National Archivist, and communicate archival needs and concerns to decision-makers, researchers, and the general public (CCA, n.d.-b). Finally, ArchivesCanada.ca, created by the CCA in 2001,³ has a mission to "provide the Canadian public greater access to the documentary heritage held by archives in this country" by way of a national database, and by lending support to other archival programs and initiatives across Canada (ArchivesCanada.ca, n.d.-b). The CCA has produced an archival standard called *Rules for Archival Description* or RAD, designed to improve accessibility for Canadian users through the standardization of descriptions (Bureau of Canadian Archivists, 2008).

LAC has played a leadership role, one that stems from its responsibilities for legal deposit (which collects published works produced in Canada), and from its mandate "to support the development of the library and archival communities" (GOC, 2012a). Until recently, the federal government funded the National Archival Development Program, the only national program that provided support to the wide range of archival organizations in Canada. This program, the funds for which were transferred through LAC to the CCA, was terminated in 2012 (LAC, 2010; CCA, 2012). LAC also for a time helped support local digitization efforts through national and provincial councils. More recently, LAC has committed to a Trusted Digital Repository program with the mandate to digitally preserve its own holdings over the long term. Between 2013 and 2015, LAC aims to "digitize and put online about 75 million new pages of documentary heritage" in order to make more of its holdings "discoverable" and "available" to the public (Déry, 2014).

3 Originally known as the Canadian Archival Information Network, or CAIN.

1.5.5 Degrees of Digital Sophistication Among Canada's Memory Institutions

Memory institutions appear to vary considerably in the degree to which they are pursuing available opportunities, with libraries generally more receptive to digital opportunities than other types of memory institutions. In part because of different mandates, and thus the different materials they preserve, each type of institution has had a unique response to the digital age. Canada's public libraries have long been offering digital services and products to customers. Internet workstations, electronic databases with local and remote access, and public wireless connections have now become standard offerings for the majority (CULC, 2011). Many large university research libraries have been at the forefront of more sophisticated opportunities, having engaged in a number of successful collaborative digital projects. Examples include the Ontario Council of University Libraries and its Scholars Portal, which in 2013 became the first digital repository in Canada certified as a Trusted Digital Repository by the Center for Research Libraries in the United States (Johnston, 2012; Whitehead, 2013). Other examples are digital data preservation initiatives, such as the Ontario Data Documentation, Extraction Services and Infrastructure initiative (ODESI). ODESI was established in 2007 by academic libraries as a digital repository for social scientists seeking data on Canadian surveys (ODESI, 2014).

Because the holdings of archives and museums can be either rare or unique, institutions in most cases carry out the process of digitization themselves if they decide to make parts of their holdings available online. In contrast, libraries generally hold one of numerous copies of a given publication, many of which are already in digital form. Once a digital copy of a resource is made, it can be distributed among countless libraries. Several major research libraries have taken advantage of this possibility by forming consortia, which have allowed considerable sharing of resources and given readers access to a vast array of those resources online. Museums have also begun to share resources through the Reciprocal Research Network, though to date it operates on a smaller scale than the research library consortia (see Box 5.1).

Museums and art galleries also face difficulties in that the character of the physical objects they hold (e.g., paintings, sculptures) is less easily translated to digital form than a printed page or an audiovisual document. While digitization and online access increase accessibility for those who may not be able to visit a museum physically, or make fragile and/or rare items more available, such forms of access may feel less authentic to the viewer, although this may change in the future as virtual reality technology makes "virtual visits" more common. Thus, a museum or gallery may need to consider how the public will respond to a digital initiative, whereas it is already clear that many users of libraries prefer

the convenience of digital access to physical material (Silipigni & Dickey, 2010). Because of their specific responsibilities, archives strive to ensure that digitized records are not only properly managed (with content-rich metadata to make them searchable and understandable, and with proper authentication uniquely linking them to the original and to their context), but also preserved in a legally acceptable format. They also need the funding and personnel to meet these requirements. Few archives in Canada can match the resources of the major university research libraries.

When it comes to born digital materials, museums, galleries, and archives have similar issues related to authenticity and accuracy, intellectual rights, and software obsolescence, except that archives must ensure feasibility of preservation and monitor authenticity from the moment the records are created. Thus, they have to continuously interact with the creators of the records, be they government agencies (in the case of government archives) or their own institution (in the case of a university archives, a museum archives, a corporation's or any organization's archives). Libraries do not have these issues in relation to books and journals (except for intellectual rights), but they are beginning to encounter them with the preservation of dissertations, pre-print publications, research papers, and other materials whose nature is close to that of records and unique digital artefacts.

The archival community appears to be lagging in adapting to the digital environment. A major challenge is making analogue holdings digitally accessible to the public. This is an area in which Canada's largest archive, LAC, is falling behind. It has so far digitized only 1%, or 25 million items in its total analogue collection (Cobb, 2013), a percentage which is getting lower as its collection expands. To help address this challenge, LAC has drafted a Migration Strategy and Action Plan for Legacy Digital Storage Media and Information Resources 2013–2016 (LAC, 2013b). It has also partnered with Canadiana.org to digitize an additional 60 million items; this collaboration is expected to more than double LAC's digital holdings over the next decade (LAC, 2013c). Though these initiatives and policies help move LAC towards its digital goals, they have not been fully implemented (CDIS, 2010; Johnston, 2012).

Municipal and provincial archives are demonstrating varying degrees of adaptation to the digital age. For example, the Archives of Ontario maintains a website that allows visitors to search all holdings, view digitized records and photos, and access archived websites for a small number of public inquiries (e.g., the SARS Commission) (Government of Ontario, 2011b). In British Columbia, responsibility for the BC Archives was transferred from a government ministry to the Royal British Columbia Museum, which charges a fee because it does not have the funds

to process archival material. In addition, it does not have the ability to accept electronic records, instead requiring government ministries to print their records and transfer them in paper form to the Archives for subsequent microfilming. As a result of these cumbersome and expensive processes, “33,000 boxes of valuable government records have been accumulating in warehouses for the past 10 years rather than being deposited in the BC Archives” (Denham, 2014). This example illustrates the issues that memory institutions are facing in terms of lack of funding and lack of records management systems that are appropriate for the digital age. In contrast, the City of Vancouver Archives (profiled in Box 5.2) has emerged as a leader in the development of an open source digital preservation system.

The digitization of physical objects becomes more pressing as more users rely on online interfaces to access holdings. As noted in LAC's 2013 *State of the Holdings* report, “while the extent of material acquired has grown markedly over the past three decades, LAC has continued to fall behind in applying resource-intensive traditional approaches to the description of holdings.” The report states that, in the 1980s, more than 80% of incoming accessions were fully described at the outset. This fell to one-half by 1990, and to one-quarter by 1996. Since this time, less than 10% of annual government accessions have been processed (LAC, 2013b). As a result, heritage items run the risk of being overlooked, improperly stored, or remaining digitally inaccessible by an increasingly internet-reliant public.

At the Canadian Archives Summit in 2014, it was recognized that the archives in Canada have fallen behind in part because they have tended to focus inwardly rather than attending to the changing demands of their users. This recognition prompted calls for a more outward-looking and strategic focus that emphasizes the development of alliances, partnerships, and public awareness (Wilson, 2014).

Funding levels have also been a critical factor influencing the extent to which memory institutions have pursued digital opportunities. Many of the international opportunities identified in subsequent chapters have been undertaken by national institutions and are typically beyond the means of the majority of smaller institutions. This is especially true in the current fiscal climate, where budgets for many institutions, including the larger ones, have been cut back. In a 2010 survey of CARL members, an organization that represents 28 university libraries and three national institutions (LAC, the Canada Institute for Scientific and Technical Information, and the Library of Parliament), 84% of respondents reported a decrease in overall funding (Dooley & Luce, 2010).

1.6 APPROACH AND METHODOLOGY

To address the charge from LAC, the Panel conducted a detailed review of literature from a wide range of traditional and non-traditional sources, including peer-reviewed journals, books, official reports and statistics, institutional websites, and social media. The use of non-traditional sources of information documented in specialized blogs and other social media has been important to encompass the range of new practices and services that are at the leading edge of a rapidly moving digital frontier. Given the pace of technological and social change, information and analysis on important trends are at times only available in these non-traditional sources. In recognition of this pace of change, the Panel decided that the assessment would be of greater value if it focused not only on the opportunities themselves but also on the mechanisms by which they can be realized, namely resource sharing and collaboration.

The assessment also draws widely on international examples from countries whose memory institutions have been at the forefront of adapting to the digital landscape. Examples from the United States, Australia, and Europe feature prominently throughout this report. Though some of the examples identified may be unique to their national context, and therefore less applicable to Canada, they have been included because of the potential that they demonstrate.

The Panel notes that few of the digital practices developed in response to technological innovation, changing public expectations, and meeting mandates in a digital age have been formally evaluated to determine their effectiveness or value. There is therefore an insufficient foundation of reliable evidence for assessing which are best practices. Also, many of the opportunities and challenges arise in the context of specific types of memory institutions, such as research libraries or archives, and are therefore not presented as options for memory institutions generally. And while cross-domain opportunities are increasing, they generally encompass only a subset of the different types of memory institutions.

In identifying the opportunities, the Panel made some necessary assumptions. The first is that the internet is both universal and enduring and will continue to underpin the connectivity of society for the foreseeable future. Second, the reliance on digital technologies will continue to grow and change, and open up new possibilities that are currently unforeseeable.

Finally, this assessment comes at a time of much interest in how our public institutions can keep pace amid rapid digital change. The Public Policy Forum's *Preserving Canada's Memory* (2013), the 2014 Canadian Archives Summit, and the Royal Society of Canada's *The Future Now: Canada's Libraries, Archives, and Public Memory* (2014) are all important contributors to this dialogue, each using a different lens for a common and fundamental challenge. For its part, this report focuses on the digital challenges and opportunities that are common to the different types of memory institutions with the goal of providing guidance to those decision-makers concerned with the long-term success of Canadian memory institutions, both large and small.

1.7 THE STRUCTURE OF THE REPORT

The Panel has structured the report to emphasize the digital opportunities themselves and the ways in which they can be realized.

Chapter 2 reviews how Canadians are communicating and working in the digital age and how records and other materials are being created. It also establishes the critical context for why change is important.

Chapter 3 examines the challenges faced by memory institutions in the digital environment, which has brought about not just new technology and expectations, but also important cultural shifts, such as participatory culture and collaboration.

Chapters 4 and 5 look at new opportunities and best practices offered in this new context. Those that can be realized by enhancing engagement with users of memory institutions are discussed in Chapter 4, while those that come about through resource sharing and collaboration are in Chapter 5.

Chapter 6 discusses the management issues and external support that can influence the uptake of the new practices discussed in Chapters 4 and 5.

Chapter 7 summarizes the Panel's key findings in response to each of the questions in the charge. It concludes with final reflections from the Panel on how memory institutions can best transition to the rapidly changing digital environment.

2

The Digital Imperative

- **Digital Technology in Today's Society**
- **Digital Technology and Our Documentary Heritage**
- **Conclusions**

2 The Digital Imperative

Key Findings

Digital technology is ubiquitous and enmeshed in the daily existence of Canadians and operations of governments. Its use has fundamentally altered the way in which we communicate and network, and the type of records we create.

Together with social media, digital technology has transformed how we produce and consume documentary heritage. Production has been democratized, resulting in very significant increases in both the amount produced and the number of producers. As for consumption, it is increasingly carried out online with Canadians ranking among the most significant consumers of digital online content in the world.

With content now often digitally born and residing in a myriad of formats and platforms, it is increasingly beyond the reach of many of the traditional tools that memory institutions have used to fulfill their mandate of preserving documentary heritage.

This chapter identifies the most prominent dimensions of the digital age that need to be considered by memory institutions if they wish to successfully adapt and thrive. It examines how Canadians are now communicating, interfacing with, and creating culture, and how governments today are creating records. The Panel recognizes that the rate of change is rapid and that the digital landscape and our networked society are evolving in unpredictable ways. At the very least, the changes documented below underscore the imperative for memory institutions to respond to this digital environment.

2.1 DIGITAL TECHNOLOGY IN TODAY'S SOCIETY

Though many historians couch the arrival of new technologies as “revolutions” that herald unprecedented impacts on society and individuals, other scholars resist what Mahoney (2005) calls a “machine-centred history” of the interaction between humankind and technology, whether in reference to the printing press, radio, television, or the internet. Rather, as Mahoney points out in relation to the internet and digital technology, “the history of computing is the history of what people wanted computers to do and how people designed computers to do it” (Mahoney, 2005). In other words, the technology we possess is a result of different communities adapting machines to their own purposes, and the benefits

or challenges that accompany these developments can be both anticipated and unexpected. However, even as society creates and to a degree controls its technology, new technology can also shape the wider context around it.

It can, nonetheless, be helpful to think in terms of “revolutions” at times, insofar as individuals or organizations within the larger society may find themselves facing rapid change for which they are not prepared. The internet has profoundly affected memory institutions, which are harnessing its potential as well as grappling with its challenges. What Rainie and Wellman (2012) call the “Triple Revolution” proved to be a useful concept for the Panel as it considered the ways in which memory institutions operate in today’s digital environment. Rainie and Wellman believe that the results of this “Triple Revolution” are a shift away from centralized hierarchies to multiple social networks; a proliferation of the “personalized” internet, one which is available at all times and in most spaces; and the immediate and habitual accessibility that digital devices afford (Rainie & Wellman, 2012).

The first component of the “Triple Revolution” is the “Social Network Revolution,” which produces more diversity in social worlds and relationships and creates not only bridges to reach these worlds but also the manoeuvrability to move among them (Rainie & Wellman, 2012). The second component, the “Internet Revolution,” gives people extraordinary information-gathering and communication powers. Individuals are now their own publishers, broadcasters, archivists, and researchers. Moreover, the internet is personalized: it is a service we each use in our own way to communicate and find information. Finally, the “Mobile Revolution” allows people to carry their information and communication needs with them at all times, in purses, pockets, eyeglasses, and, if present predictions hold, in implants. Rather than being rooted to home or office desktops, people using such devices can transmit and access information generally at will. It is now less important that people are separated in space and time from each other and from institutions (Rainie & Wellman, 2012).

These three “revolutions” have jointly fostered “networked individualism,” in which people function more as connected individuals and less as embedded members of a few groups that find their memories only in a limited number of centralized institutions. People are now members of multiple, specialized social networks that require more choreography and exertion to present and access information. They meet their information needs by connecting to a variety of networks and sources. Perpetuated by a continuous flow of new devices, faster information networks, and innovative applications, the “Triple Revolution” continues to alter how people live, work, play, and communicate. Getting

information is no longer just a function of receiving it from sources such as books, newspapers, and archives, and from one-way broadcast media such as TV, radio, film, and even digital downloads (Rainie & Wellman, 2012).

The digital environment has influenced social transformations beyond changes in how people communicate and network. We now live in Mark Weiser's once-imagined world of "ubiquitous computing," wherein digital devices are not just all-pervasive, appearing in multiple sizes and formats (e.g., tablets, smartphones), but woven into daily existence to the extent that we may not always notice them. Weiser (1991) argued that "hundreds of computers in a room could seem intimidating at first, just as hundreds of volts coursing through wires in the walls once did. But like the wires in the walls, these hundreds of computers will come to be invisible to common awareness. People will simply use them unconsciously to accomplish everyday tasks."

Digital technology and information are now so pervasive that they have become remarkably unremarkable. As Miller (2011) writes, "it is no longer its novelty, uniqueness, or potential to transform life, but its mundane nature and pervasiveness which now give the Internet its significance." The internet in general has become "enmeshed within the enduring structures of our society" such that "the online sphere is no longer a realm separate from the offline 'real world,' but fully integrated into offline life." We have reached a point, in fact, where "ubiquitous computing" has rendered distinctions between different types of devices largely meaningless; it's all digital now, whether we seek information at a desktop computer, through Apple TV or Google Glass, or at a touchscreen in the lobby of a national museum.

2.2 DIGITAL TECHNOLOGY AND OUR DOCUMENTARY HERITAGE

Cultural and intellectual materials are shifting ever more into a digital space and growing in such quantity that they are increasingly beyond the reach of many of the traditional tools that memory institutions have used to fulfill their mandate of preserving documentary heritage. This section reviews how digital technology is changing our documentary heritage and underscores the need for memory institutions to respond quickly to the digital challenge.

2.2.1 New Modes of Communicating

When initially adopted by the public in the 1990s, the Web was used mainly as a means for publishing and consuming mostly static content. It was the age of what has been called *Web 1.0* (O'Reilly, 2007). Web capabilities have, of course, evolved considerably over the latest decade into what is called *Web 2.0* (O'Reilly, 2007).

Web 2.0 is used increasingly for communication, real-time interaction, and the co-creation of content (Manovich, 2009; Deschamps *et al.*, 2012). Hallmarks of Web 2.0 include the popularity of social media applications such as Facebook and Twitter, the ubiquity of comment sections beneath online news articles, and the growing authority of Wikipedia and other user-defined “wikis” or knowledge repositories. Within this more social web, the user’s own voice or value creation gains significance. The dominance of social networking and new communication channels is a testament to the significance of this shift. Whereas Web 1.0 featured email, Web 2.0 offers a myriad of communication forms: blog posts, comments, Tweets, reviews, ratings, gestures and tokens, votes, links, badges, photos, video, and two-way video interaction (Chan, 2009a), all of which feed into Rainie and Wellman’s “Social Network Revolution.”

The Web continues to evolve. With the progression towards developing languages for expressing and linking information that can be then processed by artificial intelligence algorithms, the Web is moving into what has been called its 3.0 or *semantic* phase (Berners-Lee, 1998). According to Ross (2005), “the Semantic Web will advance the relational database model and overturn old ways of organizing information [...]. Rather than listing information in tree structures, it will create a Web based on the relationships of people, places and things as they exist in the real world” in order to “advance the information revolution [...], changing everything from how users set up their online address books to how they pay their taxes.” The implications of this next Web for memory institutions are far-reaching, but to date its progress has been “incremental” (Hawkins, 2009). Some analysts are skeptical that Web 3.0 will ever be transformative: “The semantic web is more than 12 years old and still puttering along. From a business perspective, it is going nowhere slowly” (Grimes, 2014).

Coinciding with the evolution of the Web have been advances in mobile communications. In 2013, there were more than 27 million mobile subscriptions in Canada, enabling more than 270 million text messages to be sent daily (CWTA, 2013). Further, as of May 2013, 56% of Canadians have smartphones and use them to communicate through many channels (Google, 2013). Of these smartphone users, 78% use them to access social networking services, with 52% checking their social media feeds on a daily basis (Google, 2013).

Mobile devices and social media have together had a profound impact on how, when, where, and what people communicate with one another. With the preponderance of cameras in smartphones, and the ease with which images can now be created and shared, photography is being revitalized as a communication medium (Bilton, 2013). The trend of using pictures, no longer as simply objects of memory but of communication, is fuelling the popularity

of social media companies like Instagram and the use of multimedia message services (Malik, 2011). While SMS (Short Message Service) messaging declined by 5% from 2011 to 2012, multimedia messaging service (MMS) jumped by 41% (WF, 2013). Instagram users are at present sharing over 40 million images per day (Etherington, 2013) while Facebook users share 350 million per day (Crook, 2013). Video sharing services, now offered by Twitter and Instagram, point to the next iteration of communicating by image. According to Instagram's CEO, Kevin Systrom, images appeal as a form of communication in part because they transcend languages (Gigaom, 2011).

These types of digital records have historical value and cultural significance. For memory institutions, which have traditionally acquired communications as records of people and their communities (e.g., letters, photographs, and diaries), ephemeral digital communications are indeed valued. Today's blogs and microblogs share a number of important similarities with analogue diaries and letters, which suggests that, while the medium of communication may evolve, the content of our communications is at least partially unchanging. People continue to document important events in family and community, in both analogue and digital forms. Facebook and Twitter postings, like diary entries, tend to be short and are concerned with the "new information of the day" (Humphreys *et al.*, 2013) and often come attached with photos. These brief messages can reveal much about the culture from which they stem.

Blogs, Facebook postings, and Tweets are often the primary record of global events such as wars, revolutions, and natural disasters. Recognizing the value of these types of digital communications, the U.S. Library of Congress has taken the initiative to acquire all Tweets since 2007 — over 170 billion and rising quickly (Gross, 2013). Acquiring these microblogs fits with the organization's mission "to collect the story of America, and to acquire collections that will have research value" (The Telegraph, 2013).

Another growing reality is the increasing popularity of social media channels that claim that digital communications made through their service are "unrecoverable" or at least difficult for the average user to find. Snapchat, Hash, Confide, and Wickr are some examples of messaging apps that allow messages and images to self-destruct on devices in a short period of time — mere seconds in some cases — after they have been viewed. In 2013, Snapchat was used for some 400 million photo messages a day around the world (Crook, 2013), which speaks to the popularity of this service; Nico Sell, the cofounder of Wickr, argues that "ephemeral data is the future" given the rise of privacy concerns

(Varin, 2014). This trend towards the self-destructing message presents another layer of challenge because the near instant expiration of data makes it difficult to preserve communication that may be important in the future.

In a recent study of six major events, including the Egyptian revolution, Michael Jackson's death, and Barack Obama's Nobel Peace Prize, researchers compiled a list of some 1.1 million Tweets with embedded links to online resources (SalahEldeen & Nelson, 2012). They then tracked this content over time. One year after these resources were shared, 11% had disappeared and only 20% were archived. After two and a half years, 27% were lost and 41% archived. From these data, SalahEldeen and Nelson (2012) forecast that shared resources published online are being lost at a rate of 0.02% a day after the first year. Whether or not this trend will translate into a digital black hole in the historical records of nations, as is feared by a number of national memory institutions (Moses, 2009; Smith, 2009), will ultimately depend on how successfully institutions respond to the challenge of identifying and acquiring potential documentary heritage right after creation.

In addition to concerns about saving material produced using social media, other concerns include whether outlets such as Facebook and Twitter are capturing minority viewpoints. Despite the hope that social media platforms might provide new avenues for those who would otherwise remain silent to share their opinions, a study by the Pew Research Center revealed that this was not the case. In fact, people were less willing to discuss a controversial issue on social media than they were in person, and for both settings (online and in person), they were more likely to express their opinions if they believed that their peers agreed with them (Hampton *et al.*, 2014). Thus, people may not always be enthusiastic about sharing openly and honestly using online forums that — for at least a certain period of time — display a record of their thoughts, which can be scrutinized by a wide audience.

In a similar vein, legislators are contending with the reality of “oral government” in an age when government business is conducted using more ephemeral communications such as texts and instant messaging, or verbal conversations, to avoid creating any records at all. British Columbia's Information and Privacy Commissioner, Elizabeth Denham, has voiced concern about the growing trend of disappearing records, which impacts government transparency and accountability and hampers freedom of and access to information (Denham, 2013). Denham and her counterpart in Ontario at the time, Ann Cavoukian, have called for “duty to document” legislation at the provincial and federal levels, in line with the U.S. *Federal Records Act* and the U.K. *Public Records Act*, to better document government decisions and actions, and to prevent both accidental and deliberate

deletion of digital files that the public expects to be able to access on demand (Cavoukian, 2013; Denham, 2013). Cavoukian has also called for stronger enforcement and penalties for agencies that do not comply with the *Privacy Act* or that destroy documents to which the public has right of access (Leslie, 2014).

In contrast, Mayer-Schönberger (2011) points out that, because of digital technology, forgetting has now become the exception rather than the norm, which has consequence for individuals who must now, as Google CEO Eric Schmidt puts it, “[live] with a historical record.” This, the author notes, is a sharp break with our history, throughout most of which “forgetting has been the norm and remembering the exception.” While forgetting may be the exception in the sense that internet data such as digital images tend to remain online in some form, memory institutions are faced with the challenge of capturing drifting or buried caches of digital material, organizing this material, and preserving it in such a way as to make it perpetually locatable and retrievable.

2.2.2 New Ways of Learning

The digital initiatives taking place in the memory institution landscape are enhancing educational value and engagement. When library, archival, or museum holdings are digitized, they can be used to teach students through collaboration; memory institutions can provide discoverable and accessible digital material; and educators can develop suitable teaching mechanisms (Proffitt & Schaffner, 2008). For example, the U.K. National Archives Education Service is an award-winning program developed with education professionals; it provides free online resources and teaching sessions, and supports the national curriculum for history from Stage 1 up to A-level, along with programs about a variety of other topics for both teachers and students. Kalnikaite and Whittaker (2010) found that “digital records allow students to perform better on quizzes than existing tools such as traditional reminder and organic memory.” They note that such tools are often more enjoyable than traditional teaching aids, but caution that digital resources are “a valuable adjunct to classroom attendance and discussion, rather than a direct substitute for attending.”

This collaborative model between memory institutions and educators is bilateral, argues Murphy (2012), and beginning to shift institutions away from “workshops with a defined, pre-planned outcome.” As digitization and new digital technology change the way people learn, and as docents and other institutional educators provide information about collections, museum visitors are in turn “providing museums themselves with new ways to view their collection” through, for instance, public tagging activities (see Section 4.2).

It is not just collaboration and methodologies that are changing today's classrooms. More than a decade ago, Lankshear *et al.* (2000) were pointing out that pedagogical relationships and expectations were also shifting, impacting the ways in which people were learning. The digital age, with its "superabundance of information" provided in part by expanding online archives and libraries, was modifying the old educational paradigm of the book — and teacher — as authority. At the turn of the millennium, Lankshear *et al.* (2000) pointed out that "the circumstances, conditions and the very *status* of knowledge, learning, teaching and researching are currently in a state of profound upheaval under the double impact of rapid and far-reaching technological change and the massive assault on longstanding narratives of foundation and legitimation."

Today, the decentralized digital classroom, by providing access to online content, allows students to search out knowledge in ways not possible a generation ago. While face-to-face teaching is recognized as highly valuable, the rise of online learning environments indicates that these are supplementing, and in some cases replacing, the professionals, physical spaces, and filtered curricula that have traditionally accompanied education. Today's students are active searchers of information operating outside the curated spaces of school libraries; in addition, the availability of online content via search engines means students can seek out nodes of data at much earlier ages. The records provided by online collections established by memory institutions further open these information channels and modify learning habits in the 21st century.

These new learning habits, such as the decentralized digital classroom and the changing authority of the teacher, have reshaped knowledge pursuit for the public. They have made learners less reliant on the bricks-and-mortar library or museum, which in turn has made such loci less "authoritative" and transformed some into context providers rather than traditional information gatekeepers. At the same time, many people no longer use physical books for their research but prefer the convenience of searching for material online (Connaway *et al.*, 2011) or what Harley *et al.* (2007) call "the path of least resistance." There is now a propensity for students and researchers to risk missing seminal texts that have not yet been digitized or to believe online-only literature searches are "complete," in part because of their automatic nature — a concern that educators have been expressing since the rise in popularity of the internet in the late 1990s (Stevens-Rayburn & Bouton, 1998). "If it's not online it doesn't exist" has become the mantra for many researchers (Stevens-Rayburn & Bouton, 1998; Goldsmith, 2005), and while digital content is considered convenient and substantive (Harley *et al.*, 2007), it tends to provide people with more varied and fractured information.

2.2.3 Producing and Consuming of Culture Online

In 2012, International Data Corporation (IDC) estimated that “from 2005 to 2020, the digital universe will grow by a factor of 300, from 130 exabytes to 40,000 exabytes, or 40 trillion gigabytes (more than 5,200 gigabytes for every man, woman, and child in 2020)” (Gantz & Reinsel, 2012). Such enormous digital caches are challenging enough to manage on their own; the task with which memory institutions are faced becomes even more formidable as they consider how best to manage the exabytes of information generated online: the 100 hours of video uploaded to YouTube every minute, the countless online newspapers, magazines, and blogs, and the hundreds of millions of social media users producing digital content every second of every day.

Canadians are contributing to this proliferation of newly produced digital content, and are in fact one of the most highly connected and engaged online populations in the world (Figure 2.1). Among the world's leading economies, Canadians were the heaviest online searchers, with 140 queries per month. They ranked first in the average monthly visits to the Web per visitor and third in the average monthly hours spent online in 2013 (comScore, 2014). In 2012, 17% of Canadians subscribed to video streaming service provider Netflix and more than one in three Canadians watched TV online (CRTC, 2013; Payton, 2013; SC, 2013a). Furthermore, according to a Statistics Canada study, some 87% of Canadians between the ages of 15 and 24 now listen to downloaded music at least once a week (Allen, 2013). And while the younger generation has been leading the transition, survey data find that the older generations narrowed the gap notably in 2010 in their use of the internet, as compared with 2000 (Allen, 2013).

These statistics point to a broader trend in consuming and producing culture online. Canadians readily contribute to the sheer volume of data created on a daily basis worldwide, some of which memory institutions are expected to manage, and all of which far exceed the amount of information envisioned by the architects of physical institutions.

These statistics are not, however, representative of all segments of Canadian society. A 2013 Statistics Canada report finds a persistent digital divide along socio-economic and demographic lines. Internet use is only 62.5% in households in the lowest income quartile, and only 77.8% in households in the second lowest quartile. Wealthier Canadians are more likely to use the internet regardless of age, and among the poorest Canadians over the age of 65, only 28.5% access online services (SC, 2013a, 2013c). Moreover, CRTC's 2013 *Communications Monitoring Report* highlights varying broadband availability across the country. While most residential households in Yukon, the Northwest Territories, and



Figure 2.1

Canadian Online Engagement

Canadians are among the world's most engaged internet users. In 2012, 83% of Canadians over the age of 16 accessed the internet for personal use from any location, using desktop computers or handheld devices. Over half of Canadians downloaded or watched movies online while 39% watched television online and 50% downloaded music from the internet. Social media engagement is also high, with over two-thirds of internet users (67%) visiting social networking sites (SC, 2013a). Comparisons to other leading economies suggest that Canadians are one of the most highly engaged online populations in the world, ranking first in the average monthly visits to the Web per visitor and third in the average monthly hours spent online in 2013 (comScore, 2014).

Nunavut now enjoy broadband speeds between 1.5 and 4.9 megabits per second (Mbps), for instance, only 29% of Nunavut households are able to download content at speeds greater than 5 Mbps, compared with 94% of households in British Columbia and 95% of households in Ontario (CRTC, 2013). The Canadian government is, however, working to provide broadband service with a minimum speed of 5 Mbps to nearly all Canadians, including those living

in rural and northern communities (Ditchburn, 2014). In contrast, Finland is currently working to implement speeds of 100 Mbps for all households by 2015 (Fiser, 2010).

Mobile devices have created a capacity for *sousveillance*, which is what Mann *et al.* (2003) call the recording of agencies and organizations by the public. *Sousveillance* turns the observed into the observer — thanks to smartphones or hidden cameras — so that those who have traditionally been surveilled by governments, police forces, and private businesses can now offer up alternate accounts of events with supporting audiovisual evidence. *Sousveillance* has, for instance, influenced reports about police use of force. The actions of figures of authority are now reflected back at them through the public's own devices as well as CCTV cameras or dash-cams. The video shot by smartphones is not subject to bureaucratic or security limitations; it can go public and spread across the Web quickly. These publicly created data, some of which are important legal or historical records, add to the volume of digital holdings memory institutions have the responsibility to acquire, and may present challenges when it comes to acquiring them from private citizens.

In 2006, the OECD wrote that digital content “will increasingly become the basic creative infrastructure underpinning the knowledge economy, and at the centre of health, educational, and cultural activities,” adding that it is “a rapidly growing sub-set of the output of the creative, cultural, copyright and/or content industries” (OECD, 2006). This statement is as accurate now as it was then, and points to a trend whereby more and more of our culture is being created in a digital space. Manovich (2009) notes that the Web 2.0 environment has in fact redefined such terms as *content*, *cultural object*, and *cultural production*. Online conversation is an example of this new form of cultural production. A single comment under an online news story may prompt follow-up responses from whomever, wherever (including representatives of the news organization itself), in a way that allows conversations to “in theory go forever” (Manovich, 2009). This cultural development has no parallel outside of the online infrastructure. It is also becoming the norm: 89% of American teenagers who post photos online, for example, report that other people have commented on them (Manovich, 2009).

New technology and social media have democratized the production of art to the point where not only has the amount produced increased considerably, but so too have the sources. Beaty and Sullivan (2010) observe that there is “currently a greater level of diversity in cultural products, and of cultural producers and audiences, than at any time in Canadian history,” adding that “on the level

of sheer gross output, Canada now produces more cultural material in more forms than at any time in its history.” Some of that material is produced by “net artists” such as Canadian GIF artist Lorna Mills who “uses the net’s bounty of imagery as a canvas to crumple, slice, stomp, and leave gyrating images on your screen” (Galperina, 2012). Many net artists, however, are far from non-professional; Mills exhibits her work around the world and sells her GIFs on dedicated tablets (Sandals, 2014). Capturing these cultural products requires digital preservation technologies very different from the systems used for curating physical art pieces.

While the trend towards online cultural production is likely to strengthen as more publications, organizations, and media shift exclusively to an online format and the popularity of video streaming and internet television continues to grow, there may be a limit to the online production and consumption of culture. A recent survey of the average reader in Canada, for example, shows the enduring appreciation for the printed book; sales of ebooks have slowed and possibly plateaued at 15% of the Canadian book market (BookNet Canada, 2013), although this may have something to do with the rising cost of ebooks, which is now often comparable with that of paperback novels (Trachtenberg, 2011).

2.2.4 Government Produced Digital Data

Governments at all levels are creating born digital records such as emails, studies, surveys, and reports. A superabundance of digital government records is creating information management challenges for the Canadian government, which could benefit from digital recordkeeping systems not only to help manage documents but also for the sake of accountability and transparency (Wilson & Henhoeffler, 2014). In the case of many governments in Canada, however, “recordkeeping and information management continue to be practiced in most departments using analog records management techniques and technology systems” (Wilson & Henhoeffler, 2014). Whether or not Canadian governments have taken advantage of digital recordkeeping systems, they are nevertheless producers of hundreds of terabytes worth of digital records as well as traditional analogue records, both requiring management and preservation.

The federal government has also implemented GCpedia, a wiki-based document collaboration platform hosted internally, which, as noted in a 2010 Conference Board of Canada report, has the potential to link over 250,000 employees in more than 100 departments and agencies nationwide (Deschamps *et al.*, 2012). By one estimate, as of May 2012, some 18,000 content pages had been developed and viewed internally 14 million times. GCpedia, which is one of several tools known as GC2.0, is a collaboration tool for cross-government initiatives; it

is also an increasingly essential repository of government knowledge that maintains institutional memory in a time of increasing rates of retirement (Eaves, 2009). Specific departments are also developing their own wikis (e.g., Natural Resources Canada) (Deschamps *et al.*, 2012).

Externally, government use of Web 2.0 is creating new rules for citizen participation by providing more flexibility for public engagement. Governments now communicate information electronically to citizens, other government departments and agencies, employees, and businesses. They are interfacing in real time with the public on social media channels such as Twitter. Younger politicians have embedded Twitter in their standard communications plans. Some have been described as “compulsive” users of social media (Bryden, 2014), who Tweet several times a day. Some Ministers also Tweet frequently. Additionally, many government websites and Web 2.0 platforms now carry a comment section or a virtual-type suggestion box (Chua *et al.*, 2012). The adoption of Web 2.0 applications has implications for the flow of information as it shifts governments away from simply publishing information to sharing information with interactive and participative citizen-users, who may generate additional content (Bertot *et al.*, 2010; Wigand, 2010; Nam, 2012).

De Kool and van Wamelen (2008) argue that the adoption of Web 2.0 applications can ultimately enhance government service to the public. For instance, departments such as the Public Health Agency of Canada, in collaboration with the World Health Organization, have developed a global health network, which in real time aggregates all news articles across the globe in an effort to monitor disease pandemics (Brownstein *et al.*, 2009). This tool has been instrumental in informing public health officials in Canada and abroad about influenza and Severe Acute Respiratory Syndrome (SARS) outbreaks (Brownstein *et al.*, 2009). Government adoption of Web 2.0 indicates that social media is now an important channel over which authentic and authoritative government information is circulating, and an important platform through which decision-making can be influenced. Web 2.0 has enhanced government services in Canada and around the world, while at the same time contributing to the volume of government records that archives and other memory institutions are tasked with preserving.

2.2.5 The Expansion and Fragmentation of Culture in the Digital Sphere

Be it social structures or work structures, the Web is changing society and, by extension, our culture. The Web can enable and reinforce centralized control within organizations, through email systems and websites, for example, which

help keep employees “on message” or “on brand.” And yet the Web can also be a decentralizing force. On the social front, Rainie and Wellman (2012) note the shift away from a group-oriented society to a networked society, one that is enabled by the internet and mobile communication devices. Previously, people were members of a densely knit set of broadly encompassing relations, e.g., communities, work groups, or civic organizations. Today, a networked society has emerged thanks to the Web, in which people do not belong to any one group but have partial memberships in a variety of more weakly bounded networks. People’s relations have become more fluid and diversified but also less secure. The prominence of networks over groups can be seen in the widespread connectivity through travel and information technology, looser group boundaries (as evident in the rise of non-traditional families), the decline of structures and bounded voluntary organizations, and, finally, increased personal autonomy as evident from more fluid boundaries in the areas of ethnicity, gender, religion, and sexual orientation (Rainie & Wellman, 2012).

These looser networks of society are not simply abstractions. Digital technologies have deeply penetrated the fabric of interpersonal relations, family, and work life. Rather than ties between groups, people now “connect as individuals to other individuals,” the result of which is a “networked individualism” whereby the individual is the primary unit of connectivity — not the household, group, or any other organization or social structure (Rainie & Wellman, 2012). Naturally, digital communication features prominently in this networked realm, with mobile, email, texting, and messaging channels now far outweighing landline communication among today’s families.

In analyzing society from the vantage point of social media engagement, boyd (2010) describes the networks that form on social media sites as a legitimate types of public. These “networked publics” are spaces constructed through networked technologies, which result in “imagined collective[s] [...] from the intersection of people, technology and practice” (boyd, 2010). They are new types of public with their own dynamics, and which are becoming increasingly widespread and more difficult to distinguish from traditional publics. boyd (2009) describes how we now inhabit a world of information flows in this new realm, “living with, in and around information” and “adding to it, consuming it, redirecting it.” We have entered an era of networked media, having dismantled the centralized distribution channels of traditional broadcasting and replaced them with new networked structures for information distribution. Information spaces are likely to continue to “get more niche,” with people “consuming to understand and producing to be relevant.”

2.3 CONCLUSIONS

With the popularity of services such as Google, YouTube, Flickr, news blogs, and numerous social media channels, the Web has become society's primary means of communication, freeing the development, sharing, and storing of cultural content from its dependence on desktop computers (if not central servers), and indeed, on the professions that have given order and meaning to cultural heritage. In the process, it is calling into question the very role that memory institutions can and should play in a digital society. New expectations and realities about transparency and privacy are emerging. As Rainie and Wellman (2012) point out, people are no longer passive acquirers of information from a few centralized hierarchies. Their interests are segmented. They expect to satisfy their interests through their personal digital media while they participate in the creation of cultural content that is meant to be shared; collaborate with individuals, groups, and organizations worldwide; and rely on memory institutions to preserve, organize, and disseminate — to an uncertain degree — much of this new, digitally born content.

The trends identified in this chapter present significant challenges for memory institutions as collectors and keepers of cultural heritage. The next chapter shows how these challenges relate to basic technical issues associated with digital preservation, dealing with the sheer volume of content, managing copyright, and, not least, remaining relevant to users in the digital age.

3

Implications for Memory Institutions

- **Challenges for Memory Institutions**
- **Towards Realizing Digital Opportunities**
- **Conclusions**

3 Implications for Memory Institutions

Key Findings

There are increasing indications that suggest Canada is now lagging behind other countries in its response to digital opportunities.

Many of the traditional tools that memory institutions have used to fulfil their mandates are no longer sufficient for acquiring, preserving, and providing access to our documentary heritage.

Memory institutions face numerous challenges as they attempt to adapt to the digital age, including dealing with rapid obsolescence of the technology used to create, maintain, and preserve digital materials; appraising and making accessible mass quantities of digital data and records; remaining trusted as repositories that hold documentary evidence of government and citizen activities for both memory and accountability; interpreting copyright laws; and remaining relevant to their users.

Digital technology has played into two important cultural shifts that have influenced the environment in which memory institutions operate. One is towards a participatory culture; the other is towards a culture of collaboration. The opportunities associated with these two shifts are central to the success of memory institutions.

Canada's track record in the pursuit of leading digital opportunities related to documentary heritage was strong in previous decades. In 1973, the former Public Archives of Canada was a pioneer in recognizing the importance of "machine readable" material as part of our cultural heritage, having established a machine readable division to aid in preserving computer-generated records (Naugler, 1978). A year prior, Canada had established the Canadian Heritage Information Network (CHIN, n.d.), which is now a special operating agency of the Department of Canadian Heritage that serves as a national centre of excellence to museums and other member heritage institutions across Canada. Over the decades, CHIN has encouraged museums to use IT and more recently, in 2001, supported the establishment of the Virtual Museum of Canada, which has hosted a number of award-winning online exhibits using content from close to 1,600 museums (VMC, 2014).

The 1970s also brought about the Canadian Institute for Historical Microreproductions (CIHM), which sought to preserve early printed Canadian materials on microfilm. By 1997, CIHM had moved to digitizing a portion of its microfiche and providing online access to these titles; in 2008, CIHM merged

with AlouetteCanada to become Canadiana.org. As a national aggregator and service provider, Canadiana.org now operates the Canadiana Discovery Portal, which provides access to some 65 million pages of content from 40 memory institutions, and delivers digitization and preservation services to memory institutions (Canadiana.org, 2013a, 2013b).

LAC, for its part, has had digital initiatives in place since 1995 when it first established the Electronic Publication Pilot System to define how to treat digital acquisitions bound to a physical medium such as CDs, as well as those virtually acquired as part of LAC's e-publications, e-theses, or web-harvesting applications (LAC, 2013b). LAC has been harvesting the Web domain of the Federal Government of Canada since 2005 and also has the authority to collect a representative sample of Canadian websites. The Government of Canada Web Archive was launched online in 2007 (LAC, 2007a; GOC, 2012a). In addition, LAC was a founding member of the International Internet Preservation Consortium, which was formally chartered in 2003 (IIPC, 2012a, 2012b). In 2009, LAC introduced modernization initiatives intended to promote, with the assistance of digital technology and the Web, open access to Canada's documentary heritage (LAC, 2009c).

Despite these national initiatives, there are increasing indications that suggest Canada is now lagging behind other countries in its response to digital opportunities. While recent Canadian efforts to address the digital challenge through initiatives or infrastructure have foundered, similar institutions in other countries have moved ahead, establishing transformational policies and organizations to guide and implement their digital preservation projects. The National Digital Stewardship Alliance (United States), the Digital Preservation Policies (United Kingdom and Australia), Europeana, the EU's i2010 strategy for a European Information Society for growth and jobs, and the many other examples identified in subsequent chapters are all signs of significant efforts to respond to digital opportunities that have no parallel in Canada. With respect to international opportunities, Canadian memory institutions are at best occasional participants, as shown in Chapters 4 and 5, and still striving to be at the forefront of innovative pioneering projects.

3.1 CHALLENGES FOR MEMORY INSTITUTIONS

As memory institutions pursue digital opportunities, they encounter many challenges. The trends of the digital age go to the very core of the role of memory institutions as collectors and keepers of cultural heritage. The sheer quantity of digitally born records, the creation of new cultural communities in digital spaces that know no borders, the erosion of traditional knowledge authorities, the fragmentation of audiences, and the rapid growth of new cultural content (popular or otherwise) challenge the traditional practices of appraisal, description, and preservation.

Is all information worth preserving, or, more specifically, is every story worth remembering? (LAC, 2013a). Can the important information be identified in the first place, especially given the fact that digitally born content typically resides in one of numerous communication channels and is collectively stored on innumerable and mostly private digital platforms? Can digitally born information be authenticated and preserved to the traditional standards? (Hirtle, 2000). And are libraries, archives, and museums as cultural institutions losing ground to less “authoritative” sources of cultural knowledge? (Chan *et al.*, 2008).

The new cultural reality also raises questions about the role of memory institutions and how they interface with society. Operating in the digital world requires that one finds ways in which “content can be surfaced in context, regardless of where it resides” (boyd, 2009). Making content available requires it to be embedded in streams of information (e.g., streams of social, entertainment, or news information) and readily discoverable in the ways in which the public is acquiring and disseminating knowledge and information (boyd, 2009).

All of these questions suggest that a fundamental transition is required for memory institutions to remain relevant. But the challenges in doing so are significant. Memory institutions, as Waibel and Erway (2009) point out, “have each created an orderly world within their respective domains through the power of shared practices and standards.” This orderly world has been disrupted by digital technology, which requires an appropriate response.

What follows is a review of some of these challenges, including new technical issues that are unique to the preservation of digital content, the problem of storing the massive amounts of digital material that is produced on a daily basis, and the new factors now relevant to making appraisal decisions (e.g., the urgency with which decisions must be made due to the ephemeral nature of digital information and the feasibility of preserving authentic and usable digital records). As digital records become more and more prominent, memory institutions are also striving to remain trusted as repositories that preserve evidence to hold government and citizens accountable, to interpret copyright laws, and to remain relevant to users.

3.1.1 Basic Technical Challenges of Digital Preservation

Before the digital age, most documentary heritage was affixed to a material medium — stone, paper, wood, or film — with readily discernible boundaries. Furthermore, the affixed information was accessible from the object itself without any additional processing required. In the digital world, these basic premises, which lie at the core of the traditional practices and processes used for managing documentary heritage, do not apply.

Paper records and other tangible objects can be experienced directly by people, and remain accessible and intelligible after long periods of neglect if simply stored in a dry enclosed environment. They can also sit for decades before being evaluated for possible retention in archives or another memory institution. The same is not true of digital records, which can only be experienced when they are processed by technology (Heslop *et al.*, 2002). These records need proper digital management, ongoing conversion to accessible formats, and migration to new systems; they also require content-rich metadata to make them searchable and understandable. Otherwise, these materials will be lost or at best incomplete, unintelligible, inaccessible, or not verifiable as authentic. Indeed, because of their ephemeral nature, decisions about which digital materials to preserve must be made very close to the time of their creation.

Digital preservation is sometimes discussed in terms of “bit preservation” and “functional preservation.” Bit preservation involves preserving the basic contents of a digital file (the sequences of the digits 0 and 1) exactly as it was created without the slightest change. Because bit errors may cause the entire contents of a file to be lost, bit preservation forms the basis of all digital preservation activities (Garrett & Waters, 1996; Smith *et al.*, 2003; Heydegger, 2009; Zierau, 2012). Although bit preservation ensures secure storage of files and includes monitoring for changes over time, it does not ensure that digital material remains immediately usable (e.g., viewable, playable, searchable). In contrast, functional preservation keeps the files in a format that can be processed by available technology into meaningful objects and also ensures that contextual information is provided to help users interpret the material they have accessed (Smith *et al.*, 2003; Anderson, 2011).

The Open Archival Information System Reference Model, a high-level, general model for digital preservation (discussed further in Section 5.2.1), has developed a schematic to explain how a digital record is converted to meaningful information (Figure 3.1).



Reproduced from CCSDS (2012)

Figure 3.1

Obtaining Information from Data

For non-digital objects (e.g., hardcopy books), the data contained within them (i.e., observable characters on a page) can be understood without any additional information and processing. In contrast, a digital “data object” only produces meaningful information when it is interpreted using “representation information.” For example, the raw data (bits) for a JPEG file can be converted to pixels by JPEG software, which has been provided with the necessary representation information (the JPEG standard that defines the conversion process). The “information object” is an image formed by the pixels (CCSDS, 2012).

The challenge for a memory institution is the successful preservation of an “information object.” To accomplish this goal, an institution must identify the “data object” and the associated “representation information” required to create a meaningful object each time a user decides to view a record (CCSDS, 2012). In addition, a memory institution must ensure that the information object can be generated using currently available hardware and software. The most immediately obvious strategy for digital preservation would be to preserve both the data object and the technology (e.g., operating systems and media drives for devices such as floppy disks and CDs) needed to process it. However, this approach, known as “technology preservation” (Paradigm, 2008b; National Archives of the Netherlands, n.d.), is not practical for several reasons (see Table 3.1).

Table 3.1

Difficulties of Technology Preservation

Challenge	Explanation
Rapid Technological Obsolescence	Due to the rapid pace of computer science and engineering, hardware and software become outdated quickly. Manufacturers continually release new versions of existing technologies to keep consumers interested and these are often incompatible with older versions.
Maintenance of Old Technology	Housing and maintaining old computers is time-consuming and expensive; these machines will eventually degrade and ultimately cease to function. It is difficult to find replacements, forcing preservers to rely on online advertising and auction sites such as eBay and Craigslist. The more obsolete a given technology becomes, the more challenging it is to find people with the technical knowledge to operate and repair it.
Storage Media Decay	Storage of digital data on media such as disks and tapes is not appropriate to ensure long-term preservation due to the short lifespan of these devices. For example, low-quality burnable CDs may decay after approximately two years.

Heslop *et al.* (2002); Blau (2006); Paradigm (2008b); Kirschenbaum *et al.* (2010)

Rather than technology preservation, the two main strategies for long-term digital preservation are migration and emulation (Heslop *et al.*, 2002; Kirchoff, 2008). According to Kirchoff (2008), “migration involves transforming digital content from its existing format to a different format that is usable and accessible on the technology in current use.” Ideally, the new format should remain usable well into the future (even in the face of technological obsolescence). Emulation, on the other hand, “involves developing software that imitates earlier hardware and software” (Kirchoff, 2008). Thus, emulation allows a meaningful digital experience to be recreated on a computer that is currently functioning (Heslop *et al.*, 2002).

Migration, which is the most widely used digital preservation strategy, is well suited for static digital objects such as images and text. Procedures for standard migration tasks are well established. In contrast, emulation has not been widely tested and is a much less feasible strategy due to the large commitment in resources that it requires (e.g., highly skilled computer programmers). However, for specialized tasks, such as preservation of computer games, emulation may be required (Paradigm, 2008a; von Suchodoletz & van der Hoeven, 2009). For example, in 2012, the Museum of Modern Art acquired several classic video games (including Pac-Man and Tetris), which were included as part of its Applied Design exhibit in 2013–2014. Some of the older games were emulated to allow visitors to interact with them (Antonelli, 2012; MoMA, 2014).

Although migration and emulation are ideal for ensuring accessibility in the long term, they are not always feasible, particularly for smaller institutions without the resources to implement large-scale digital preservation programs. Furthermore, they may not be a practical first step for an institution that is just beginning to consider preservation activities (NDSA, n.d.). The National Digital Stewardship Alliance (NDSA) has defined four levels of digital preservation, going from basic bit preservation, which includes storing multiple copies of files (Level 1), to a comprehensive digital preservation program that allows continued file access, file repair, storage of metadata, and migration or emulation if needed (Level 4). Institutions can use the criteria for each level to assess their existing preservation programs or to choose appropriate starting points based on their goals, needs, and resources (NDSA, n.d.).

3.1.2 Challenges in Dealing with the Sheer Volume of Digital Data

A major challenge in dealing with born digital data is sheer volume, since it includes not only large quantities of materials produced by organizations (ANDS, 2010) but also copious amounts of user-generated content created using web-based tools such as blogs, YouTube, Facebook, and Twitter (Yoon, 2013). Outside the archival community, many people fail to see why it is necessary to select certain content for long-term preservation and instead hold the view that “storage is cheap, so why not keep it all?” (ANDS, 2010). But the most expensive component of digital preservation is represented by the human resources required to control the material and make it accessible; furthermore, even though digital storage continues to increase in efficiency, it is not infinite.

Since 2007, the IDC, with sponsorship from EMC (a major global data storage corporation), has been releasing annual studies on the digital universe (EMC Corporation, 2014). According to IDC, in 2010, the amount of data in the digital universe reached the zettabyte mark (a zettabyte is a trillion gigabytes) and its size is expected to double every two years from now until 2020

(Gantz & Reinsel, 2010, 2012). IDC's 2008 study found that 2007 marked the first year where "the amount of information created, captured, or replicated exceeded available storage" (Gantz *et al.*, 2008). The growth of storage capacity continues to lag behind the growth of the digital universe (Gantz & Reinsel, 2011). In addition, for every gigabyte of stored data, a million gigabytes or more of transient data (e.g., digital TV signals that are watched but not recorded, packets temporarily stored in routers, and digital surveillance images that are overwritten with new ones) may be generated, and unused storage within the digital universe must be left for these short-lived data.

There are limitations to managing data created by the ever-expanding digital universe. First, the storage of one digital file inevitably necessitates the storage of several others for purposes of security (i.e., back-up files). Second, there is expected to be a major deficit in the number of skilled IT professionals who are available to manage the onslaught of digital data: from 2012 to 2020, the amount of information managed directly by data centres is expected to grow by a factor of 14, with the number of IT professionals growing by a factor of less than 1.5 (Gantz & Reinsel, 2012). Keeping as much digital data as storage will allow, with minimal appraisal, is also not the answer. This practice will lead to a high noise-to-signal ratio and increased time and effort for the individual who is seeking specific data (ANDS, 2010). Thus, it may not be logical to just "keep it all."

3.1.3 Challenges in Selecting and Appraising Digital Heritage

The premise that certain records have continuing value as historical evidence, and that this should be a major guiding principle for archivists when selecting records for preservation, is basic to archival appraisal. Long before the onslaught of massive quantities of digital data, Bearman (1989) discussed concerns about using traditional appraisal methods, which involve focusing on records themselves and determining the elements that will likely give them continuing value. Even 25 years ago, Bearman (1989) argued that these methods were constrained by "limited manpower" and would "not permit us to review a plausible quantity of the overall documentation of our society."

As the digital age continues to progress, this challenge is becoming increasingly relevant. Furthermore, it is now compounded by a sense of urgency. Appraisal decisions about copious amounts of born digital content must be made quickly before it either disappears (e.g., Tweets) or becomes inaccessible due to technological obsolescence. An additional challenge involves determining the value of some novel types of content (e.g., user-generated information contained in blogs, Facebook posts, and YouTube), which may not be immediately apparent. Although the digital environment creates some new appraisal challenges, many

of the challenges relevant to paper records (e.g., determining the original context of creation of a record once it has migrated into a new environment) are simply amplified in the digital world (InterPARES 1 Appraisal Task Force, n.d.). The intensification of these challenges is often caused by issues discussed in the preceding sections: the technical difficulties of keeping files accessible and the overwhelming effort required to tackle mass quantities of material.

To deal with these challenges, Bearman (1989) suggested taking a more proactive approach by selecting the types of records that should be retained before records are created. Although this idea has not been put into practice, some government archives have adopted a strategy referred to as *macroappraisal*, which assesses the significance of the broader context of records rather than the content of the records themselves (Cook, 2005). This strategy involves the identification of the most important government organizations for a given jurisdiction, the key functions of these organizations, and the records creators for each function, and then analyzes only their records for preservation (Paradigm, 2008a). Macroappraisal has been used extensively by the National Archives of Australia as well as LAC (Cunningham & Oswald, 2005). This method is well suited to modern institutional records but does not claim to be useful for all types of archiving (Cook, 2005).

Unlike government archives, which are legally obligated to keep certain government records, other archival institutions have a wider set of factors to consider when deciding which digital records to preserve. One important factor is whether the authenticity⁴ of the records can be maintained. Archivists must decide whether it will be feasible to preserve the essential elements of a digital file based on hardware and software that are either currently available or expected to become available (InterPARES 1 Appraisal Task Force, n.d.). Another element to consider is whether the staff expertise and financial resources will be in place to allow for authentic preservation of a body of digital records (Harvey, 2007).

For digital records that are not required by law to be preserved, the final appraisal decision will depend on achieving a balance between value and feasibility (e.g., records that are deemed extremely valuable may still be chosen for preservation even if the process will be difficult and costly) (InterPARES 1 Appraisal Task Force, n.d.). These decisions can be made by individual memory institutions, and several models and decision trees have been developed to help them determine whether a digital resource should be preserved. For example,

4 An authentic record is “a record that is what it purports to be and is free from tampering or corruption” (InterPARES 1 Authenticity Task Force, n.d.).

CHIN released a digital preservation toolkit for museums in 2013, but the methods recommended may be applied to other types of memory institutions (CHIN, 2013). The InterPARES project has also developed a model to define the activities involved in selection and appraisal (InterPARES 1 Appraisal Task Force, 2001).

The internet presents some additional selection and appraisal challenges. Archivists generally agree that it is not practical to maintain access to all digital data indefinitely. However, the save everything approach is being used in some cases for web archiving, where memory institutions are harvesting the entire portion of the internet under a specified domain or domains (e.g., .nz for New Zealand and .se and .nu for Sweden) to provide a snapshot of the Web at various points in time. This type of undertaking, which requires an on-site team of software engineers and project managers, is generally not feasible for the majority of memory institutions. Instead, they may outsource harvesting to another organization such as the Internet Archive (Mayr, 2011). As of May 2014, the Internet Archive's Wayback Machine had indexed 400 billion web pages, allowing visitors to browse the Web as it looked from 1996 onwards (Internet Archive, 2014).

A further consideration in the digital age is the fact that organizations and individuals may wish to completely destroy all digital evidence of sensitive documents, emails, or photos (Tsesis, 2014). For research data, ethics boards may require destruction or de-identification of data (Tri-Council, 2010). The digital age has made this challenging for organizations, since copies of a file are often dispersed throughout an institutional network or stored on remote servers accessed via the Web (Curiac & Pachia, 2013). Thus, organizations that store digital data must consider laws relating to privacy and data destruction. The public undoubtedly appreciates the convenience of major search engines such as Google, but may also resent them if there is information that they would like to be "forgotten." This issue has been brought to the forefront by the 2014 "right to be forgotten" ruling in the European Union. The ruling states that, if requested to do so, a search engine "is, in certain circumstances, obliged to remove links to web pages that are published by third parties and contain information relating to a person from the list of results displayed following a search made on the basis of that person's name" (CVRIA, 2014). The ruling, which has effect only in the European Union, applies even if the information still exists on the web pages. In July 2014, Google had approved 50,000 of the 90,000 requests it received from individuals wishing to remove links to personal information and Microsoft began accepting requests to remove search results from Bing (Cuthbertson, 2014a, 2014b). The ruling was controversial and highlights the difficulty of balancing privacy and free speech.

3.1.4 Challenges in Assuring Reliability and Authenticity

For archives in particular, assuring reliability has become an increasingly difficult challenge in a digital context. Defined as the trustworthiness of the content of a record (including data accuracy, the correctness and precision of the data), assuring *reliability* requires control of the process of records creation, which should be established by each creator through policies, procedures, and carefully designed workflows and metadata schemas. These help to ensure the making of the right records, by the right person, at the right time, as a matter of course, in the usual and ordinary development of activity (InterPARES 2, 2014). Records so created are considered by common law as an exception to the hearsay rule and readily admissible as evidence. Archives have the responsibility of guiding the records creators whose material they are mandated to preserve in establishing creation control and in maintaining and monitoring it.

Similarly, assuring continuing authenticity has also been made more difficult in the digital age. Defined as the trustworthiness of an object that it is what it claims to be and has not been tampered with or inadvertently corrupted, *authenticity* requires maintaining the metadata that reveal its identity and show the integrity of any process of duplication, conversion, or migration carried out to overcome technological obsolescence, as well as the documentation of the system(s) in which the object was created and exists, so that its integrity can be demonstrated and, by inference, the integrity of the records⁵ (InterPARES 2, 2014; InterPARES 1 Authenticity Task Force, n.d.). To ensure that authenticity can still be verified in the event of loss of metadata and documentation, memory institutions can use *redundancy*, that is, duplication of the acquired material and dispersion in several locations. If memory institutions have no knowledge of the process of creation, maintenance, and use of the material they acquire, they can only assure that it remains as it was when acquired, so they can be certain the material is the authentic acquisition.

3.1.5 Legal and Accountability Challenges for Memory Institutions

As discussed in Chapter 1, memory institutions have roles that are vital to the functioning of state institutions and to society in general. Government archives, in particular, are required by law to keep government records; some of them also retain material from other public bodies and from the private sector. These records provide the evidence for investigations of all kinds, including lawsuits, human rights inquiries, and examinations of past government policies and practices (Wilson, 2012). Archives have been described as “the very foundation

5 The latter is a requirement of the federal and provincial Evidence Acts in Canada and is embedded in the Canadian General Standards Board (CGSB) 72.34 standard on Electronic Records as Documentary Evidence, issued in 2005 and in the process of being updated at the time of writing.

of civil order” as well as “the basis for memory, continuity, and social order” (Wilson, 2012). Archives have traditionally focused on evidence as their central mantra, but as Cook (2013) argues, they have gradually shifted from guarding the “entire documentary residue left by creators” to representing the many truths, voices, perspectives, and stories of society with only a portion of the records that are generated. However, the concept of unmediated and untainted evidence is still an important archival concern (Cook, 2013).

Since 1974, more than 30 truth commissions have been established (Amnesty International, 2014) and archives have been vital for their activities. Truth commissions are typically created by international organizations or national governments of the countries in question (Avruch & Vejarano, 2001). They seek to investigate abuses of human rights, to inform citizens of the events that took place, and, possibly, to suggest steps to help those affected (Amnesty International, 2014). The Truth and Reconciliation Commission of Canada is currently addressing the mistreatment of Aboriginal peoples at residential schools (see Box 3.1).

Truth commissions, as with many other historical inquiries, have been carried out primarily by combing through decades-old non-digital records. However, as more records are being created only in digital formats, new challenges are arising that have the potential to hinder investigations. For example, to maintain open and transparent government, various legislative acts, such as the Ontario *Archives and Recordkeeping Act*, require the records of public bodies to be retained (Government of Ontario, 2009). Although governments have a responsibility to manage all types of records appropriately, it may be easier to incorrectly categorize newer forms of communication (e.g., emails) as records with no long-term value. In Ontario, this issue was highlighted following an investigation of the recordkeeping practices of a former chief of staff from the provincial government who routinely deleted all of his emails. In addition, he also preferred verbal communications and avoided creating paper records (Cavoukian, 2013). As a result, the minister's office was unable to provide any records relating to a particular political decision when requested to do so. These types of practices, in which dominant digital forms of communication are not recognized as important records or are avoided altogether, may lead to issues with future inquiries.

Box 3.1**The Truth and Reconciliation Commission of Canada**

During the era of Canadian residential schools, which began in the 1870s and continued for over a century, more than 150,000 First Nations, Métis, and Inuit children were torn from their families and forced to endure deplorable conditions. Among the many injustices and harms they experienced, children were forbidden to speak their languages and practice their cultures, as these church-run institutions attempted to remove the influence of family and community on their “intellectual, cultural and spiritual development” (TRC, 2014). To help with the process of disclosure, commemoration, and healing for Aboriginal peoples affected by these schools, implementation of the Indian Residential Schools Settlement Agreement began in 2007 (GOC, 2014b). One component of the Agreement was the establishment of a Truth and Reconciliation Commission (TRC) with the mandate to document what took place by relying on records and testimonies of survivors and their family members, as well as operators and funders of the residential schools (TRC, 2014). Members of the TRC also visited the oral history archives of the Aboriginal peoples of Canada and collected the oral testimony of elders and knowledge-keepers (Moran, 2014).

The TRC was tasked with collecting records from approximately 30 government departments and 100 church archives from across the country (Moran, 2014). Hearings will continue until early 2016. In July 2014, controversy arose over the fate of the recordings, transcripts, and decisions produced during the hearings. The chief adjudicator of the residential schools claims process called for destruction of the documents to protect the privacy of those who provided testimony (Alamenciak, 2014b). In August 2014, an Ontario Superior Court judge ordered that those who testified would be given the right to decide whether they would like their testimony preserved. If consent is not provided, documents will be destroyed following a 15-year retention period beginning in 2016 (Alamenciak, 2014a). This issue demonstrates the difficulty in achieving balance between privacy protection for individuals and memory preservation for the sake of collective knowledge.

As society continues to shift from paper to digital records, investigations may be impeded by lack of clarity concerning which information exists in digital form, which is only in printed form, and where the overlap lies. For example, during the Cohen Commission (an inquiry into the decline of sockeye salmon in the Fraser River), the BC provincial government was ordered to produce fish health records for 120 fish farms (Cohen, 2011). During the investigation,

there was some question as to whether paper copies of the digital necropsy files should also be produced since they contained some additional information. The Commissioner ultimately ruled that the extra time spent retrieving, copying, scanning, and coding the paper records would not be worth the delays it would cause (Cohen, 2011).

Until the technical/infrastructure issues involved in creating trusted digital repositories are resolved, archives may not be fully trusted to manage digital records, which may result in organizations keeping their own copies as a back-up (Oliver *et al.*, 2011). As institutions such as LAC are moving towards a model in which records creators assume more responsibility for ensuring reliability and authenticity of digital records, this could create “misguided assumptions and misunderstandings over who, at the end of the day, is actually responsible” (Price & Smith, 2011).

3.1.6 Copyright Challenges for Memory Institutions

Memory institutions are not strangers to copyright and other areas of intellectual property. However, the scenarios requiring a copyright analysis have changed and perhaps expanded in the digital realm. Although the Canadian *Copyright Act* has specific provisions for using content without permission or payment for libraries, archives, and museums, these provisions only allow for limited reproduction for the purpose of preservation, interlibrary loans, and use by individual researchers. There is no single provision in the Act that specifically deals with general reproduction, exhibition in public, public performance, transmission over the internet, publication, and other rights involved in massive digitization projects.

The fact that digitization projects usually result in internet distribution of some sort also highlights the growing importance of global copyright. The lack of a single international copyright law and the variations in copyright laws from country to country present a big challenge for online distribution. In terms of length of protection, for example, Canadian copyright law protects an author's works during their lifetime plus 50 years after their death. In the United States, the duration of protection spans the author's lifetime plus 70 years (Harris, 2014). As a consequence, a painting of an artist who has been dead for 60 years is protected by copyright in the United States but not in Canada. So a Canadian institution could use the painting in Canada but needs permission if it is to be posted online and accessed from the United States or European Union countries where duration is also the author's lifetime plus 70 years. Also notable are the copyright variations in the protection of government works. In Canada,

the *Copyright Act* states that a government owns any work that it has prepared, published, or commissioned under its direction and control. This is in contrast to the United States where government works (which have been prepared by government employees) have no copyright protection (Harris, 2014). These are just two of many examples highlighting the difficulties in managing global digitization projects.

Another copyright issue relates to acquiring permissions to use copyright-protected content. At the initiation of any project, memory institutions must identify all content that is part of the project. There may be content in the public domain (in which copyright has expired) or protected content. Protected content may be owned by the institution, licensed by the institution for specific permitted uses, or owned by someone other than the institution. In the latter two situations, institutions may undertake hours and hours of research (sometimes weeks and months) to identify copyright holders, locate the holders, and obtain the required permissions from them. For certain works, particularly moving image and sound recordings, there may be multiple creators and copyright holders (Deegan & Tanner, 2008). For example, performing arts recordings may involve contributions from directors, choreographers, actors, costume designers, set designers, and lighting technicians, and all can claim some copyright protection (Evens & Hauttekeete, 2011). Memory institutions may be reluctant to preserve these collective works because identifying the copyright owners, locating them, obtaining licence agreements, and keeping records of each agreement will undoubtedly be a resource-intensive process (Muir, 2004).

This is all the more so for works where it may not be possible to locate the copyright owners, possibly because a work is anonymous, the company that owned the copyright is no longer in business, the copyright cannot be traced due to multiple transfers, or the owner or his or her representatives cannot be found. Memory institutions often avoid using these so-called “orphan” works altogether to avoid the risk of penalization if the copyright owner surfaces (Hirtle *et al.*, 2009). This is more common in the United States where, despite many attempts, there are currently no legislative solutions for using orphan works; however, ongoing efforts are working to resolve this issue.

In Canada, orphan works (referred to as “unlocatable copyright owners”) can be used for digital and online purposes without permission from copyright owners provided that a licence is obtained from the Copyright Board (Harris, 2014). To do so, applicants must satisfy the Board that reasonable efforts to locate the owner of the copyright have been made (GOC, 2012b). The permission is only

valid in Canada and does not protect from infringement proceedings stemming from uses outside of Canada due to having made it available online. As such, it falls to the licensee to ensure that appropriate measures, technological or other, are in place to avoid inappropriate use of orphan works in countries where permission is required for their use. If copyright owners surface within five years after the Copyright Board issues a licence, they are eligible to collect any royalties as set out in the terms of the licence (Harris, 2014).

Finally, the digital environment is also posing some unique challenges for moral rights, particularly in the area of digital preservation. The moral right of integrity protects the work of authors and performers from being “distorted, mutilated or otherwise modified”; the moral right of association protects their work from being “used in association with a product, service, cause or institution” without their permission (GOC, 2012b). For the right of integrity or association to be violated, the honour or reputation of an author or performer must be harmed. Migration to a new file format may cause some unintended changes to the look, feel, or functionality of a digital object, and it is possible that the author or performer may feel that the changes were derogatory (Ayre & Muir, 2004). It is possible that changing a coloured image to black and white results in a violation of moral rights. As in most things in copyright law, the rules for this issue are subject to interpretation, and depend on the circumstances at hand. Thus, memory institutions must carefully manage moral rights as they do copyrights. In Canada it is possible to obtain a waiver of moral rights but institutions need to be aware of this fact (Harris, 2014). Furthermore, waivers cannot necessarily be obtained in all countries, as is the case for EU countries, where waivers are not possible and moral rights last in perpetuity. Similar to copyrights, moral rights vary from country to country (Harris, 2005).

Special Provisions in Canada's Copyright Legislation for Memory Institutions

Canadian copyright laws give allowances for memory institutions to overcome certain legal impediments in the digital reproduction of materials through special provisions in copyright legislation for libraries, archives, and museums. These provisions, called exceptions, apply, for example, when copies are made for the management and maintenance of a permanent collection. This includes copies made for internal recordkeeping and cataloguing and for restoration, and if the original is rare or unpublished and it is, or is at risk of, deteriorating, becoming damaged, or lost, and if a copy is not commercially available. Exceptions also allow for single copies of articles from magazines and periodicals to be made for research purposes and for interlibrary loans, albeit with restrictions (Harris, 2014). These exceptions, though often helpful

to digital projects, are not without their limitations. Table 3.2 highlights the limitations of current Canadian copyright law in dealing with a number of issues now common as a result of digital technologies.

Table 3.2

Canadian Copyright Law: Libraries, Archives, and Museums Exceptions and Their Limitations in the Digital Age

Issue	Current Canadian Copyright Law*	Limitations
Motivation for Digitization	<ul style="list-style-type: none"> • A digital copy is permitted if a work is rare or unpublished and is deteriorating, damaged, or lost, or <i>at risk of</i> deterioration, damage, or loss. • A copy may also be made for purposes of internal recordkeeping, cataloguing, insurance, police investigation, or restoration. • The above rules do not apply if an appropriate copy is commercially available. 	<ul style="list-style-type: none"> • Does not cover digitization for purposes of enhancing convenience for users by providing online access, creating complete digital collections, or preserving culturally valuable materials.
Motivation for Digital Preservation	<ul style="list-style-type: none"> • Migration to an alternate digital format is permitted if the current digital copy is in a format that is obsolete or becoming obsolete. 	<ul style="list-style-type: none"> • The short-lived nature of digital objects makes it necessary to begin preserving them as soon as possible after they are acquired; waiting until technological obsolescence becomes an issue may result in loss of files or expenditure of extra effort to recover them.
Number of Copies Permitted	<ul style="list-style-type: none"> • Memory institutions are permitted to make one digital copy of a work for preservation purposes or for any person requesting a copy for research or private study provided that this person prints only one copy, does not share the digital copy, and uses the digital copy for a maximum of five business days. 	<ul style="list-style-type: none"> • While copyright laws in other countries such as the United States permit up to three copies for preservation and replacement, this is still insufficient for digital preservation, which may require multiple copies in different formats for security and access purposes.

Besek (2008); GOC (2012b); Harris (2014)

* While these copyright laws apply to Canadian memory institutions in general, LAC has some additional privileges. The *Library and Archives of Canada Act* states that “the Librarian and Archivist may do anything that is conducive to the attainment of the objects of the Library and Archives of Canada” (GOC, 2012a). This includes taking measures to preserve and restore records and preserving samples of publicly accessible material from the internet that is of interest to Canada (GOC, 2012a).

Fair Dealing

In addition to the above-mentioned exceptions that are specifically for libraries, archives, and museums, the Canadian *Copyright Act* has a provision called “fair dealing” that is available to all users of content. This provision (which is a defence to a claim of copyright infringement) allows one to reproduce copyright material without permission for specific purposes: research, private study, education, parody, satire, criticism, review, and news reporting (GOC, 2012b). According to a Supreme Court of Canada case, “‘research’ must be given a large and liberal interpretation in order to ensure that users’ rights are not unduly constrained, and is not limited to non-commercial or private contexts” (SCC, 2004).

Despite setting out allowances for copying of copyright material, the fair dealing defence is not actually defined in the Act. Indeed, there is no guidance given on, for example, the percentage of materials that can be copied without infringement. This is intentional so that the defence is flexible to meet the needs of varying situations and technology. The provision is judged therefore on a case-by-case basis. Some guidance on interpreting fair dealing has been provided by the Supreme Court of Canada, which has outlined a non-exhaustive list of factors that should be taken into account: the purpose, character, and amount of the dealing, alternatives to the dealing, the nature of the work, and the effect of the dealing on the work (Harris, 2014).

These factors were outlined most recently in a 2004 court case of a publisher, CCH Canadian Ltd., versus the Great Library of the Law Society of Upper Canada. In articulating the purpose, the ruling stated that “allowable purposes should not be given a restrictive interpretation or this could result in the undue restriction of users’ rights. This said, courts should attempt to make an objective assessment of the user/defendant’s real purpose or motive in using the copyrighted work” (SCC, 2004).

For memory institutions, which must ultimately make copyright risk management decisions that interpret fair dealing, this uncertainty may be viewed as much an opportunity as a challenge. In the absence of clear-cut guidelines, there is some flexibility to pursue innovative digital activities while still avoiding copyright infringement (Harris, 2014).

In the United States, the fair use provision (which is comparable but not equivalent to fair dealing in Canada) is being argued as a defence for the digitization of large quantities of content. Though currently on appeal, Google has thus far successfully defended its efforts to digitize millions of books without the permission of the copyright holders and post excerpts of them online for commercial use. In his 2013 ruling, which accepted Google's defence that its actions constituted fair use, Judge Chin stated that "Google Books provides significant public benefits [...] without adversely impacting the rights of copyright holders" and "provides a way for authors' works to become noticed, much like traditional in-store book displays" (Metz, 2013). The ruling was viewed as positive for libraries and researchers, but exploitative by the Authors Guild, which brought the suit forward (Stempel, 2013).

3.1.7 Challenges of Remaining Relevant to Users in the Digital Age

A major, overarching challenge for memory institutions involves striving to remain relevant in the face of cultural shifts and accompanying changes in citizens' expectations. Digital technologies have changed the methods by which the public searches for and acquires information. Users now expect information to be available from online search engines such as Google (Silipigni & Dickey, 2010), while memory institutions are becoming increasingly aware that they are not central web destinations for those seeking information (Zorich *et al.*, 2008). By delivering their content in the form of "small puddles of information on scattered websites," memory institutions are not taking full advantage of the digital experience that they could be offering their users (Waibel & Erway, 2009). Even academic users often sacrifice authoritative sources for the speed and convenience that large online search engines can provide (Harley *et al.*, 2007). Waibel and Erway (2009) ask: "How can [library, archives, and museum] collections be made visible in a time where users have limited attention, institutions have limited budgets, but where offerings from the commercial world seem unlimited? How can cultural collections leverage the Googles, Amazons, flickrs and Facebooks dominating the networked environment?"

Users are also increasingly drawn to novel tools that they can use on their computers or smartphones. Many of these tools require that memory institutions release information about their holdings to central online resources, a practice that some memory institutions are beginning to follow (see examples in Chapters 4 and 5) (CC, 2014).

3.2 TOWARDS REALIZING DIGITAL OPPORTUNITIES

Though the challenges for memory institutions are considerable, they coincide with cultural shifts that have been enabled by IT and that can help memory institutions rise to these challenges. Two broad societal changes are particularly relevant for memory institutions: the shift towards a more participatory culture and the shift towards a more collaborative culture. The Panel believes that harnessing these shifts can help memory institutions to not only overcome some of the more practical issues involved in adapting to the digital age, but also to retain their cultural significance in this time of rapid social change.

3.2.1 Embracing the Opportunities Associated with Participatory Cultures

The increasingly prominent participatory culture is reflected in the fact that people today are as much producers as they are consumers of information and art. This shift has been supported by relatively low barriers to individual expression and civic engagement made possible by IT, and strong support for creating and sharing individual or small-scale digital group creations (Jenkins *et al.*, 2009; Shirky, 2010; Tapscott & Williams, 2010). “In a participatory culture,” argue Jenkins *et al.* (2009), “members also believe their contributions matter and feel some degree of social connection with one another” and with one another’s opinions. A participatory culture results in more networked communities; more production of individual creations and “new creative forms” (e.g., YouTube videos, online zines, music sampling); more “collaborative problem solving”; and a greater ability to “[shape] the flow of media” through podcasting and blogging (Jenkins *et al.*, 2009).

In reflecting on the impact of the participatory culture on museums, Stein (2012) argues that it raises several central challenges about their role and place in the “evolving culture of our community.” In particular, participatory culture produces much of the “sheer volume of data” with which memory institutions are faced. Participatory culture also opens up opportunities for memory institutions to become more user-oriented and engage with the public in new ways to ensure their continued local and global relevance.

3.2.2 Embracing the Opportunities Associated with Collaborative Cultures

The importance of collaboration as a means to achieve success in a highly networked world is now widely recognized. Though collaboration — defined here broadly as encompassing the range of ways in which organizations work

together formally and informally to achieve a common goal⁶ — is by no means new, it has become increasingly essential in carrying out what were once core, and mostly internal, activities. Innovation, production, and service delivery now often involve some degree of collaboration (Chesborough, 2003; Tapscott & Williams, 2010). In showing how collaboration figures more prominently in sectors such as health care, media, and energy, and how these sectors are transforming themselves, Tapscott and Williams (2010) observe that collaboration is now viewed as “a profoundly new approach to orchestrating capability to innovate, create goods and services, and solve problems.”

The emphasis on collaboration also demonstrates that organizations need no longer be self-sufficient and that, by opening up to outside resources, they can access skills, knowledge, and resources that would otherwise be prohibitive to acquire internally. Indeed, given the scale and complexity of the challenges described above, few memory institutions on their own have either the knowledge or resources to adequately respond to them. Be it the overwhelming technical aspects of preserving digital records, the infrastructure required to deal with the sheer volume of digital information, or the challenge of acquiring and retaining skilled personnel, solutions to these challenges require expertise and infrastructure that are often beyond the budgets and capabilities of all but the largest national memory institutions.

3.2.3 A Framework for Realizing Digital Opportunities

The Panel recognizes that there are several internal opportunities that arise from digital technologies, many of which are specific to professional practices. The focal point of this report is the external opportunities associated with participation and collaboration, which are central to the future of memory institutions more generally. Figure 3.2 sets out the basic framework by which these opportunities are profiled and supported. Chapter 4 focuses on the participatory opportunities related to engaging users and helping memory institutions to remain relevant in the digital age, while Chapter 5 covers collaborative opportunities pursued to enhance capacity and services and build relationships. The factors associated with supporting the realization of these opportunities are reviewed in Chapter 6. Two types of factors are examined: those at the national level, which include policies and infrastructure; and those at the institutional level, such as effective management of partnerships and new business model considerations.

6 By this definition, collaboration ranges from basic cooperation and coordination to formalized partnerships, including public-private partnerships and joint ventures.

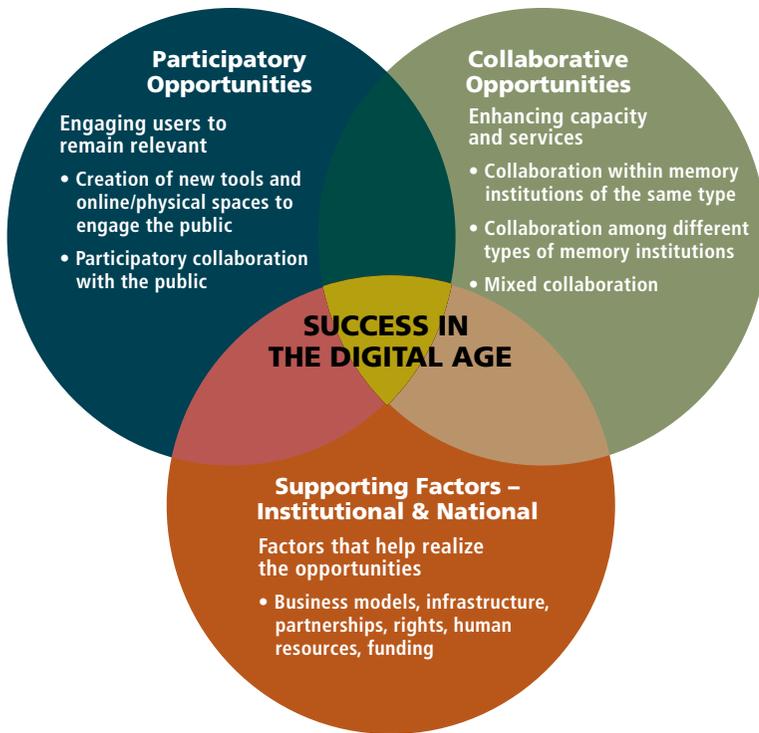


Figure 3.2

Framework for Realizing Opportunities for Adapting to the Digital Age

The figure identifies the two main areas of opportunities reviewed in this assessment: collaborative and participatory opportunities. Both areas reflect broader trends that are reshaping the landscape in which memory institutions operate. The third circle recognizes the supporting factors at the national and institutional levels that can help realize the opportunities. Chapter 4 focuses on participatory opportunities, while collaborative opportunities are covered in Chapter 5. Supporting factors are reviewed in Chapter 6.

3.3 CONCLUSIONS

Organizations of all types seek to understand how best to adapt to a digitally immersed landscape whose cultural, social, bureaucratic, economic, and technological dimensions are in a constant state of flux. Memory institutions in particular have a number of unique and often complex challenges stemming from their role as collectors and preservers of Canada's documentary heritage for posterity in a digital age. Indeed, libraries, archives, and museums must contend not only with the vast quantities of digitally born information and cultural artefacts now being created, exchanged, and consumed, but also with limitations of Canadian copyright law in dealing with issues created by digital material, potential infringement of moral rights, and issues of global copyright

that come with use of the internet for distribution. They are also challenged by a pressing need to remain relevant within society's information flows so as to maintain their cultural significance.

Although these and other digital challenges are significant for memory institutions, they are by no means barriers to change. Indeed, as the following chapters show, by taking advantage of the opportunities that have coincided with the shifts to participatory and collaborative cultures, memory institutions globally have not only successfully managed many of the challenges that they face, but have also been able to reimagine their roles with new services and a renewed sense of relevance.

4

Participatory Opportunities

- **Visitor-Centric Services**
- **Increasing Visitor and Volunteer Participation**
- **Research and Data Analysis**
- **General Challenges Related to Public Engagement**
- **Conclusions**

4 Participatory Opportunities

Key Findings

People are increasingly expecting memory institutions to deliver cutting-edge services with digital tools; they are also seeking opportunities to share their thoughts, ideas, and experiences through websites, social media, and other collaborative platforms. Memory institutions are responding by providing various visitor-centric services, including centralized online access portals for content, mobile-friendly apps, and tools that allow for engaging interactions with information and cultural material as well as sharing personal experiences.

Memory institutions are seeking new ways to retain their relevance by encouraging a participatory culture: contributions from the public range from simple tagging activities to sharing of historical knowledge to design of software by expert volunteers.

Underpinning the success of participatory opportunities is the forging of meaningful, trusting relationships between memory institutions and their potential users. Without the existence of such relationships, citizens may be unaware or uninterested in participating. The integration of a participatory culture into the daily operations of memory institutions will ensure that they establish a sustainable, authentic relationship with the public.

Adept with technology and social media, today's users of memory institutions are developing new expectations, not only for the services that these institutions offer but also for the level of participation that they allow (Stein, 2012). They demand fast and easy access to material using technology that is already "embedded in their daily networked lives" (Waibel & Erway, 2009). They also want to be able to share their thoughts, ideas, and experiences through comments, blogs, photo albums, videos, and other means. These evolving expectations are game-changers for memory institutions. Many people who work in the field of libraries, archives, and museums understand the challenges that these institutions face in terms of remaining relevant and valued while cultural norms and expectations continue to change (Stein, 2012). To keep pace with the emerging participatory culture discussed in Chapter 3, memory institutions have begun to consider and respond to the desires of their audiences.

The internet and associated digital technologies are often cited as factors contributing to declining in-person visits (Zickuhr *et al.*, 2013) along with the growing competition that memory institutions face for the "public's leisure time attention" (Stein & Wyman, 2013). These concerns, however, are by no

means indicative of a universal trend. Indeed, a growing number of memory institutions have successfully rethought their relationships with users, both online and in person, and this has led to fundamental changes in the range of services offered. The result has been more physical and virtual visits and continued relevance.

In addition to creating more visitor-centric services, memory institutions are also changing their approaches for engaging volunteers by inviting them to participate in online activities that enrich collections. Some of these participatory initiatives involve simple tasks, such as tagging digital objects to link them with other objects, or transcribing old records. Others harness the knowledge of the public to provide historical context for photos or videos. For example, in 2008, Flickr, a photo sharing site, launched The Commons (see Box 5.4). It began as a pilot project with the Library of Congress to enable the public to enhance contextual information for photos in the Library's collection (Oates, 2008). The Commons now includes photos from over 80 memory institutions (Flickr, 2014). Much of the information is provided by regular contributors who have been described as "history detectives." Other volunteers use their personal histories, such as memories of the lives of relatives or changing local neighbourhoods, and may even be able to link the information they provide to sources such as newspapers or other websites (LOC, n.d.-a). The most committed volunteers may help to engineer software programs that enable memory institutions to offer unique services for their users.

Memory institutions are also working to establish meaningful relationships with a diverse set of communities, so that people are aware and trusting of the opportunities that await them. Thus, by reaching out to the public, memory institutions are not only maintaining relevance and satisfying the expectations of their visitors, they are also forging connections and taking advantage of volunteers who can help them adapt to the digital age.

The changes described above point to a recognition of the need to reorient services to match the ways in which users are now communicating, working, and learning, and to respond seriously to the spreading participatory culture. This culture calls on memory institutions to value "the opinions, expertise and interests of their invested communities" and embrace "conversational engagement" regarding the different aspects of their collections (Stein, 2012). In doing so, a range of IT-enabled opportunities arise that can move memory institutions to the frontiers of cultural development and relevance. These range from incentivizing museum visits through mobile digital tools and developing applications to engage the public in support of archival and interpretive work to relying on expert volunteers who can make major contributions. As

stated by participant Serhan Ada at the 2011 Salzburg Global Seminar entitled *Libraries and Museums in an Era of Participatory Culture*, when successful, these participatory initiatives make those welcomed as guests “feel as though they have become the host” (Stein, 2012).

Public participation does have its challenges. As described in Section 4.4, the shift towards a participatory culture is hindered by information management challenges, issues of control and authority, and the rapid pace of technological innovation, which have the potential to change the nature of some of these opportunities.

4.1 VISITOR-CENTRIC SERVICES

Memory institutions are beginning to adapt to the digital age by developing services that are delivered through digital tools, either for reasons of convenience and practicality or for the purpose of creating unique, enjoyable experiences that encourage people to explore their culture and history. These services range from apps that enable access to library catalogues on mobile devices to entertaining, visually pleasing experiences that allow museum visitors to interact with works of art.

4.1.1 Changing Expectations

To keep pace with changing expectations, memory institutions need to make their collections accessible via the tools that the public is actually using, and design them based on the needs and wants of their visitors. One of the more basic functions of digital technologies is to provide access to materials that were once only viewable in their physical form. Access is often possible from a user’s personal computer or mobile device, and immediate access is not only desired but already taken for granted. Multiple studies have indicated that the methods used by students and researchers when seeking information are dictated by convenience, and the ease of electronic access makes it preferable to a visit to the physical library (Silipigni & Dickey, 2010).

In addition to the more rudimentary functions of making content available online, digital technologies can help memory institutions centralize information and provide it in a manner that makes it visible, convenient, and engaging for the public. People want data to be more centralized and potentially accessible through major search engines, which are the dominant place to begin searching for information (even for more authoritative sources such as e-journals). Information seekers demand speed and convenience; in fact, as with the choice between a physical and virtual library, convenience is the most important factor in choosing which online portal to use (Silipigni & Dickey, 2010).

Numerous examples demonstrate the ways in which memory institutions are adapting to changing expectations. The University of Toronto used its experience, knowledge, and history of people's interactions with the existing library catalogue to complete a redesign that made it mobile-friendly. The result was an app-like experience that took advantage of features such as touchscreen interfaces (Gayhart *et al.*, 2014). Based on its 2008 to 2013 Strategic Plan, the National Film Board (NFB) of Canada underwent a major transformation to enhance its connection with audiences through digital means. It now offers an online Screening Room, which has inspired a range of apps for smartphones, tablets, and connected TV (NFB, 2013). The NFB has established numerous partnerships, which have given citizens the opportunity to access content through Netflix, iTunes, and YouTube (NFB, 2014). The Online Computer Library Center (OCLC) has developed an iPhone app that allows users to scan book barcodes and find local libraries that carry them by accessing data contained in WorldCat (see Chapter 5) (OCLC, 2014a). To satisfy public demand for centralized access and greater transparency, government institutions are developing open data portals. The Government of Canada launched its portal in 2011 and updated it in 2013 with more datasets, better search capabilities, and the new Open Government Licence (see Chapter 5) (GOC, 2011, 2013a). A pan-European portal, PublicData.eu, provides a single access point to open data from local, regional, and national public bodies across Europe (PublicData.eu, n.d.).

4.1.2 Greater Access to Documentary Heritage

The use of digital technology to enhance access to materials held by memory institutions has been fundamentally beneficial for users. Digitization, for example, can grant broad public access to virtual copies of rare materials, which are often fragile and require delicate handling and strict preservation conditions. In December 2012, the Israel Antiquities Authority (IAA) made the Dead Sea Scrolls freely available online for the first time, giving the public access to what has been described as one of the greatest manuscript finds of all time. Having taken images of the thousands of fragments in different wavelengths, the IAA is now able to preserve the originals under strict conditions, while allowing online viewing of very detailed images that capture both physical and textual information (Tanner & Bearman, 2009; Dorfman, 2012).

The advantage of centralized online access is well demonstrated by photo viewing statistics for Flickr Commons. For example, the Tyrrell Collection (7,903 glass plate negatives from the studios of two prominent Sydney, Australia photographers in the late 1800s and early 1900s) was donated to the Powerhouse Museum in 1985 (Flickr, n.d.). In 2007, 270 of these photos were posted on the Powerhouse website and received 37,000 views (an average of 137 views

per photo). From April 2008 to April 2009, the museum uploaded 1,171 photos from four collections, including the Tyrrell Collection, to Flickr Commons. These were viewed 777,466 times (an average of 664 times per photo) (Chan, 2009b).

The digital tools developed to interface with collections are providing many new uses for cultural material. Notable in this respect is the Art Project of the Google Cultural Institute, which currently displays more than 45,000 items from over 40 countries and 250 institutions. Visitors can zoom in for closer views of objects, share them on social media and email, and curate their own online galleries, all from the comfort of home. The project also uses Google Street View “indoor” technology to pinpoint the physical location of these artworks or collections, down to a painting’s position on a gallery wall (Google Cultural Institute, 2013).

In Canada, LAC is also following this trend. It currently hosts several nationwide exhibitions in five provinces, with portraits also concurrently available on Flickr (350,000 views as of September 2013), blogs (63,000 views), and thematic podcasts (149,000 listens) (LAC, 2013d). These digital tools use old materials and redistribute them in new ways to disseminate the collective memory of Canadians, not just the tangible collection of one institution. LAC’s efforts to provide online access to the 1911 Canadian Census were well received, with an average of 17 downloads per second for the first year (Weir, 2014). Evidently, Canadians are taking advantage of available opportunities to access their heritage online.

The Rijksmuseum in the Netherlands has been a pioneer in giving open access to a high-quality collection of some 150,000 pieces. Enabling this access is a set of tools that allow users to curate a personalized digital studio; create products (with certain customizations, if desired); purchase or freely acquire the works for various personal, professional, or commercial uses; and share their curated Rijksstudio with the public (Rijksmuseum, n.d.-a). Central to the development of these tools is the Rijksmuseum API, which allows software application developers to access metadata and images from the digital collection (Rijksmuseum, n.d.-b). It has assisted in the development of over 20 museum software applications by different developers. The Rijksmuseum API includes a Fair Use Policy, though the museum holds ultimate responsibility and accountability for rights (Rijksmuseum, n.d.-c). What sets this API apart from other technology initiatives, however, is that the Rijksmuseum actually owns the artwork it presents.

4.1.3 Stronger Connections with Visitors and Volunteers

In efforts to remain relevant, memory institutions have been rethinking how they engage with their visitors. Digital technologies have been a large part of this effort. One of the pioneering organizations in this area has been the Dallas Museum of Art (DMA), which began work in 2012 to redesign the basic premise of engagement in the museum. Realizing that it can be difficult for large institutions to make a human connection with their visitors, the DMA developed an institutional infrastructure that can support various kinds of participation (Stein & Wyman, 2013).

Seeking to enhance the breadth and diversity of its impact on local audiences, in 2013 the DMA began offering free general admission and membership. When signing up as members through iPad kiosks, visitors are presented with choices for activities, all of which are designed as “new and fun” ways to connect with DMA’s collections (Stein & Wyman, 2013). Upon their completion, visitors earn “badges” that can be used to claim rewards ranging from free parking and special exhibition tickets, to behind-the-scenes access to areas of the museum not generally seen by the public. The intent of this program is to foster long-term relationships with visitors and repeat participation, which “is seen as key to establishing the hoped-for relevance of the museum in the lives of visitors” (Stein & Wyman, 2013).

Compared with other memory institutions, museums have been leaders in developing apps for their users to experience collections in new ways. For example, at the Brooklyn Museum, visitors can play “Gallery Tag!” (an interactive scavenger hunt) by finding works with certain features and then entering the accession numbers of the works to earn points and prizes (Brooklyn Museum, 2010; Szántó, 2010).

4.1.4 New Physical and Online Spaces

As memory institutions rethink their relationship with users, they are increasingly redesigning their public spaces to better accommodate the fact that people do not only visit them to consume cultural content, but also to produce it. To this end, libraries are creating new spaces for collaborative work and broader learning that involve more than just books. For example, Boston’s Central Library is working to offer new services and develop creative spaces that are open and inviting. The library is about to introduce new “homago” spaces that allow teenagers to “hang out, mess around and geek out” with game rooms, digital labs, and equipment to record music and create comic books. This outward-looking shift has coincided with a 40% jump in physical visits in the span of a year (Seelye, 2014).

Other examples include Washington State's Lopez Island Library's offering of musical instruments for checkout, and the Chicago Public Library's opening of "Maker Labs," which gives access to 3D printers, laser cutters, and milling machines. The Library Farm, part of the Northern Onondaga Public Library in upstate New York, allows plots of land to be checked out for learning about organic farming (Seelye, 2014). The main branch of the Winnipeg Public Library underwent renovations and opened as the Millennium Library in 2005. The new space includes a multilevel reading terrace with a four-storey glass wall, a Local History Room, and major works of art. Renovations of the adjacent Millennium Library Park were completed in 2012 to make the surrounding space feel safe and inviting (Kives, 2012; WAF, 2013; City of Winnipeg, 2014). In 2014, the first bookless public library in the United States opened in San Antonio, Texas, where visitors can check out one of hundreds of tablets and access one of 10,000 digital resources, use a computer, take some technology classes, or reserve a study room away from the open reading space (BiblioTech, 2014; Weber, 2014).

At the forefront of many new building designs in Canada and internationally is Norwegian architectural firm Snøhetta, which has been selected to design Calgary's new central public library and is the designer of Ryerson University's new learning centre in Toronto. Dykers (2012) captures the essence of much of the new thinking about libraries in his description of the centre, which will include a large atrium space to provide a late-night study zone with a café, and informal seating areas; learning zones and digital media activities located on the first levels; and above this, "several levels of unique learning areas that accommodate various types of student and faculty needs," each with "differing aspects of technology with which to interact."

Though the trend is much noted for libraries, a similar shift is occurring among museums where digital technologies are redefining the experience of visitors. When visiting Gallery One at the Cleveland Museum of Art, visitors can use an iPad application to navigate the museum with custom tours designed by directors or other visitors. They can scroll through thousands of artworks from the museum on a large interactive wall, save images to their iPad, and curate their own experiences (Figure 4.1). Using interactive games, visitors can also place themselves into the experience (e.g., by matching poses with sculptures) (Local Projects, 2013).



Courtesy of Local Projects (2013)

Figure 4.1

The Collection Wall at the Cleveland Museum of Art

The photograph shows a visitor interacting with the Collection Wall at the Cleveland Museum of Art. The wall is the largest multitouch screen in the United States (5 feet by 40 feet) and features over 4,100 works of art. Every 10 minutes, the wall is updated to display different images, indicating the frequency with which each has been identified as a favourite by visitors using iPads or iPhones. Staff members at the museum can use the data provided by visitors to determine which artworks they are engaging with, enabling planning of future exhibitions (Cleveland Museum of Art, 2013).

In addition to redesigned physical spaces, memory institutions are also creating online spaces that allow visitors to interact with material and each other. Many of these, such as Flickr Commons, the Google Cultural Institute, and Europeana, are discussed throughout this report. Other examples include the Make History initiative by Local Projects and the Encyclopedia of New Zealand (Te Ara). Make History involves a website that collects personal stories of 9/11 and allows visitors to search, group, and sequence histories, photos, or experiences. Photos of 9/11 are overlaid on a current Google Street View image of the photo's location (9/11 Memorial Museum, 2009; Local Projects, 2009). Te Ara invites New Zealanders to share content that helps to document the country's people, natural environment, history, culture, and society. Te Ara makes it a priority to include the perspective of the Māori (the indigenous Polynesian people of New Zealand) for each theme (New Zealand Government, 2014a, 2014b).

The above initiatives demonstrate the concept of community-based archiving of personal digital material, which has been facilitated by the digital age. Several Canadian projects provide additional examples of this approach. The Toronto Public Library has launched *youryoungstreet*, a website where people can share experiences, documents, maps, photographs, oral histories, and videos of “people, places, and events along the world’s longest street” (Toronto Public Library, 2014). Visitors can browse by map, tag, or collection (e.g., picture, video, story). The Canadian Museum for Human Rights has an online space where visitors can share their stories in writing or by uploading photographs, audio files, or YouTube links. The museum seeks stories that are both negative (e.g., experiences of unfair treatment) and positive (e.g., experiences of overcoming discrimination) (CMHR, 2014). The Web and social media are well suited to collecting and providing access to the personal stories that form an integral part of our heritage. Memory institutions can also help train members of their communities in how to become their own personal archivists; the University of British Columbia (UBC) Library’s 2014 Preservation Week activities, for instance, offer workshops on how to digitally preserve “family heirlooms, treasured antiques, old photographs and books” (Woolman, 2014).

4.1.5 Understanding Participants: Measuring Success

An important consideration for memory institutions that are attempting to engage the public is how to measure the impact of their efforts. In discussing the challenge of measuring success in art museums, Anderson (2004) states that difficulties stem “in part from the fact that, over the last generation, art museums have shifted their focus away from collection-building and toward various kinds of attention to the public — without balancing these two imperatives and without a consensus on what constitutes best practices in the latter.”

Before the digital age, it was not even clear how to measure the success of in-person visits. Anderson (2004) suggests that museum leaders must be given the tools to measure *outcomes* such as the quality of a visitor’s experience, as opposed to *outputs* such as foot traffic. Indeed, admission sales and membership fees account for a small percentage of a museum’s revenue (Tozzi, 2014). Furthermore, revenue cannot necessarily measure whether a museum is connecting with its visitors.

As director of the DMA, Anderson put some of his ideas into practice. The museum now offers free admission and membership to any visitors who are willing to share their name and email address or phone number on iPads provided upon arrival. Visitors are also given a card to scan when they enter galleries and have the option to identify works of art they like. This is allowing the DMA to collect data on the most popular galleries, the rate of repeat visits,

and the events that draw in people from neighbourhoods where museum visits by residents are rare. The data can then be used for developing strategies to reach citizens who live in areas with low attendance and showing potential donors how well the museum is connecting with people from low-income communities. The DMA has been contacted by almost 100 other museums interested in their approach (Tozzi, 2014).

Indicators of the overarching performance of a memory institution should take into account its goal or mission (Anderson, 2004). For example, does it see itself as a resource, a teacher, or an activist (Museums Now, 2010)? Now, efforts to measure online engagement are generating new questions. A memory institution must consider what it is trying to accomplish by providing services online (Fedel, 2012). Although viewing statistics can be a starting point, similar to foot traffic, website traffic does not necessarily indicate anything about the quality or meaning of an experience unless additional data are collected. The Let's Get Real research project, led by Culture24, was designed to help online organizations define and measure their success (Finnis *et al.*, 2011). The report echoes several of the sentiments articulated above by Fedel (2012), particularly by advocating that organizations "explore what and who they value, as well as understanding what their audiences value, before exploring how these can be enhanced through digital channels" (Malde *et al.*, 2014).

4.2 INCREASING VISITOR AND VOLUNTEER PARTICIPATION

As the public seeks more and more to be instantly and constantly digitally engaged, memory institutions have been seeking new ways to retain public interest in their materials by improving their social relevance and offering dedicated online spaces (Simon, 2010). Rather than simply consuming cultural products, visitors to memory institutions are being invited to participate in a learning experience or institutional activity. Projects that encourage participation from visitors and more advanced contributions from expert volunteers open up a wealth of new possibilities for memory institutions. Visitors can enrich the content or descriptive data of collections, which can help to increase the perceived value of a memory institution. Dedicated expert volunteers may even design software programs that enhance the day-to-day functions of memory institutions or create innovative applications that encourage further input from the public.

Public engagement can be envisioned along a continuum that starts with simple, pre-set tasks such as tagging photos to advanced, original engineering projects such as software design. Examples of these volunteer projects at varying levels of sophistication are provided in Table 4.1 and discussed below.

Table 4.1

A Continuum of Volunteer Projects to Benefit Memory Institutions

	Pre-Set Tasks	Original Engineering
Simple	Tagging photos	Flickr Commons back-up (Aaron Cope)
Intermediate	Old Weather Operation War Diary Other Zooniverse projects	Flickr statistics (James Morley)
Advanced	Historypin Foto Zoekt Familie (Photo Seeks Family)	Maptcha (Michal Migurski) Linkypedia (Ed Summers)

Sommer (2011); Kuper (2013); Morley (2013); Summers (2014)

Based on their professions or personal interests, expert volunteers may already be aware of the ways in which they can contribute to memory institutions. The same is not true of the general public, who may not know of the participatory opportunities that exist. Thus, the success of these participatory initiatives depends on the ability of memory institutions to forge relationships with communities.

4.2.1 Games and Tagging Activities

Games and tagging activities can provide enjoyable and collaborative learning experiences for the public without requiring expert knowledge. Through tagging (i.e., adding keywords to objects), digital objects are given descriptions and categorized more broadly for easier retrieval by both the tagger and other users (Snipes, 2007). This phenomenon of creating user-defined tags on digital objects creates what is known as a *folksonomy* (Vander Wal, 2005). Folksonomy marks a departure from the public's historical dependence on experts for organizing cultural objects. Indeed, Mai (2011) argues that having non-experts writing descriptions and classifying objects reflects a wider movement to a more collaborative and democratic approach to the organization of knowledge, away from a traditional authoritative, professional, and expert-based approach. However, many tagging activities are not yet considered collaborative, since participants are not working towards a common goal using an agreed-upon vocabulary. Instead, these activities represent a collective process (Saab, 2010).

Folksonomy has a number of benefits. It confers new perspectives on items, as individuals (who speak a vernacular rather than professional jargon) attempt to connect objects to their society (Jensen, 2010). It can also result in novel categories and descriptors (i.e., metadata) that can help objects connect more readily to communities, precisely because they are presented in familiar languages

and frameworks. In addition, it fosters inclusiveness and openness, in part by allowing many viewpoints about an object, including those of minorities and marginalized groups (Jensen, 2010).

Folksonomy is only one of several crowdsourcing activities that encourage the public to engage with metadata. Ridge (2011c) explains that the public can help improve museum catalogue records by, for example, flagging content for review or corrections, linking objects to other objects or media, stating their preferences for particular objects, or even by recording personal stories. In all cases, memory institutions play a validation role.

A number of commercial sites have also taken to folksonomy. Delicious, for instance, is a global social bookmarking tool that helps people find and remember bookmarks through tagging. Flickr provides online photo sharing with user-added tags to network similar images of interest. And LibraryThing offers an online personal library where people can tag and catalogue their books and see metadata collections created by users with similar interests (Jensen, 2010).

Archives are beginning to take advantage of volunteers to help create and mine the content of digital records. For example, the National Archives and Records Administration (NARA) Citizen Archivist Dashboard is an online platform with a goal of improving access to and engagement with historical records by facilitating multiple activities for the general public, including tagging, transcribing, editing, and uploading (Figure 4.2) (NARA, n.d.). The Dashboard also links visitors to an additional participatory endeavour, Old Weather, which is a “gamified” online citizen science project developed in partnership with the National Oceanic and Atmospheric Administration and hosted by the Zooniverse platform. The platform provides access to digitized historic ship logs through an interactive gaming medium, and volunteers are able to transcribe the data so that they can then be used by scientists, geographers, historians, and others around the world to understand environmental conditions and model climate predictions (Zooniverse, 2013). Throughout Phases I and II (between October 2010 and July 2012), 16,400 volunteers transcribed 1,090,745 pages of log books (Brohan, 2013). In 2013, the platform also received the IBM Award for Meteorological Innovation that Matters from the Royal Meteorological Society.

Operation War Diary, also built by Zooniverse, is an initiative of Imperial War Museums and the National Archives in the United Kingdom. The initiative calls on citizen historians to unlock the information contained in diaries of the units under command of the British and Indian cavalry and infantry divisions on the Western Front during the First World War. The content of the diaries is largely unknown, and the public is invited to add tags that label people, places,



Figure 4.2

The NARA (U.S. National Archives and Records Administration) Citizen Archivist Dashboard

Online visitors to NARA's Citizen Archivist Dashboard can participate in a number of activities. They can add tags to images in the archives related to specific themes (e.g., the Titanic or World War II posters); they can transcribe documents ranging from the late 18th century to the 20th century; they can add their knowledge to articles in the Archives Wiki; they can upload digital copies of their own records to the Citizen Archivist Research Group on Flickr; and they can link to Oldweather.org (<http://www.archives.gov/citizen-archivist/>).

activities, weather conditions, and casualties. This will create datasets that can be used by researchers to determine how units worked together to supply the army, make tactical decisions, engage in attacks and retreats, and evacuate wounded soldiers (Leggett, 2014; Operation War Diary, 2014).

A memory institution's encouragement of user tagging can certainly help it to demonstrate its open, participatory culture. However, the development of more sophisticated search and browsing interfaces that are able to find an object based on visual search (*computer vision*) — rather than requiring the inclusion of specific terms in the object's metadata — may reduce tagging requirements. Existing research on computer-based image classification focuses primarily on basic-level recognition of objects or scenes. Newer research aims to develop methods for fine-grained categorization, such as identifying human-object interaction activities and recognizing specific animal species (Khosla *et al.*, 2014). Despite the potential of computer vision, user tagging will still be valuable for helping to improve image

recognition software algorithms. For example, the Public Catalogue Foundation (PCF) completed the digitization of 210,000 oil paintings from collections in the United Kingdom and partnered with the British Broadcasting Corporation (BBC) to build the Your Paintings Website (PCF, n.d.-b). The website encourages public input with the Your Paintings Tagger (PCF, n.d.-a). Zisserman and colleagues from Oxford University's Visual Geometry Group are developing computer vision software to enable faster tagging of certain objects within the paintings. They have used tags generated by the PCF's "army of taggers" to "educate" and improve the software (Collings, 2014).

Although folksonomy may become less relevant as computer vision technology develops, the participatory experiences or activities discussed above can further enable the development of social capital by bridging gaps between different networks of people. They are also a method for connecting with new audiences. As Ridge notes, when people have a good experience with a memory institution, not only will they engage more meaningfully with their materials, they will also become fans of the institution and, potentially, even advocates (Ridge, 2011a, 2011b, 2011c). As participatory engagement becomes more popular, however, memory institutions will be competing for "participation bandwidth" with other organizations and projects (Ridge, 2011c).

4.2.2 Making of Meaning for Cultural Objects

Certain participatory activities initiated by memory institutions harness more than just the collective energy of the public; instead, they require volunteers with specific historical knowledge. For example, Historypin is a website where visitors can upload photos to provide glimpses of the world over time from different viewpoints. Each photo is pinned to a specific geographic location on a map and stories behind the images are included. Visitors can search photos by place or time and compare the historical images to current Google Street View images (We Are What We Do, n.d.-b). Historypin is also collaborating with libraries, archives, and museums to help them make their content available for the public to explore and interact with (We Are What We Do, n.d.-a). In addition, some of the content shared by the public is being added to the official collections of memory institutions.

Foto Zoekt Familie (Photo Seeks Family) is an initiative to return photo albums found in the former Dutch East Indies to their rightful owners. In 1942, when Japanese troops invaded the Indies, Dutch residents were put into camps and forced to hand in their photo albums. Volunteers can upload photos and add any information that could help others identify them, such as names of people, places, events, or additional clues. Visitors who are looking for specific photos can then search by these keywords (Kuper, 2013; Tropenmuseum and KIT, n.d.).

Maptcha is an effort to piece together a historical map of San Francisco (the 1905 Sanborn Insurance Atlas), which details the city and its buildings as they existed before the 1906 earthquake and subsequent fires. Volunteers are asked to align pages of the atlas with a current map to create one large, searchable digital map. This allows the public to see what current locations looked like before the devastating natural disaster hit. In 2011, over 400 people participated in the Maptcha initiative and completed the geocoding of the entire document within 24 hours (Migurski, 2011; Sommer, 2011).

4.2.3 Sophisticated Volunteer / Scholarly Engineering

Some of the digital tools that enable these participatory activities are designed and run by expert volunteers with a passion for documentary heritage. For example, Maptcha was created by Michal Migurski, the former head of a design and technology studio (Stamen Design) and now the chief technology officer for Code for America (Sommer, 2011; Migurski, 2014).

Many volunteers have contributed to the development of various software tools for memory institutions. James Morley, an interested volunteer engineer, wrote an extension on the official Flickr API to summarize key statistics across the Flickr Commons (Morley, 2013). When the Brooklyn Museum decided to delete all the content on its Flickr account (and other social media sites), two independent developers rallied to understand the impact of that deletion. Aaron Cope had, on his own, created an independently hosted back-up of all the Flickr Commons related accounts. Another developer, Ed Summers, who works at the Library of Congress, analyzed those backups to understand the audience of the Brooklyn Museum's content on Flickr (Summers, 2014). Summers is a highly active volunteer who has developed numerous tools (GitHub, 2014), including Linkypedia, which helps memory institutions determine how Wikipedia is using their digital material. The rationale for Linkypedia is to inspire memory institutions to embrace the digital environment by showing them how communities are benefitting from the content that they are sharing (Summers, n.d.).

4.2.4 Developing Relationships with the Public

Memory institutions are beginning to realize that digital projects, which may be national or even international, must establish firm roots in the community to succeed. By forming meaningful relationships that foster trust between institutions and users, memory institutions can create rewarding experiences for both parties while paving the way for future collaborations.

The Digital Public Library of America (DPLA) is an example of a digital initiative that, while large in scale, is reaching out at the community level. DPLA, which was launched in 2013, aggregates descriptive information for millions of digital objects already held by its participating institutions. Visitors can directly access these objects through DPLA. Institutions are designated as *content hubs* (large organizations, such as the Smithsonian Institution, that interact with DPLA on their own behalf) or *service hubs* (state or regional institutions that collect items from smaller organizations across the areas they serve and make them accessible to DPLA) (Cohen, 2014; DPLA, n.d.). DPLA has recruited a group of volunteer Community Reps who implement various outreach activities, including introductory sessions for elementary and secondary school teachers and librarians. DPLA also manages the Public Library Partnerships Project, which involves training local librarians in digital technologies. The librarians use their new skills to help community members digitize their personal materials, thereby enriching DPLA with local content (Darnton, 2014). By April 2014 (one year post-launch), DPLA's collection had tripled in size, from 2.4 million to over 7 million items (Cohen, 2014).

Since 2001, LAC has supported the Lest We Forget project, which provides resources for students to study individuals from their communities who served in the First and Second World Wars. Students may research military service files by viewing the originals at the Canadian War Museum or accessing digitized versions online. The project has proven enjoyable and emotional for both students and teachers. Learning the stories of individuals through their records has led participants to a deeper understanding of these landmark historical events (LAC, 2011, 2012).

Building relationships with a variety of communities (e.g., Aboriginal communities) is important. The 1990s saw a renewed effort by Canadian museums to involve Aboriginal peoples in the interpretation of their heritage by cultural institutions (see Section 5.5) (AFN and CMA, 1992). LAC initiated Project Naming in 2001, which was proposed by Murray Angus, an instructor with the Nunavut Sivuniksavut Training Program. The initiative began with the digitization of 500 photos from LAC's collection, taken in four northern communities in the 1940s and 1950s. Inuit youth transported the photos on laptops and worked with elders from these communities to identify the individuals who appeared in them. The project was later expanded to include additional photos from other time periods and areas (LAC, 2009b). The experience was meaningful for all involved and demonstrated the importance of reaching out to forge trusting relationships with the public (LAC, 2009a).

4.3 RESEARCH AND DATA ANALYSIS

Digital tools have also allowed for novel and in-depth multidimensional ways of looking at data sets. In the case of large-scale historical relics and heritage architecture, for example, structures can be examined in real time, from any angle, inside or out, and at different time periods. Holloway (2000) points out that these developments are “the most radical new way of looking at objects in space since the early European Renaissance” and illustrate how technology is adding a new layer of significance to previously static data experiences, increasing the relevance of these objects.

Digitized collections are also opening up entirely new research fields. To observe previously undetected cultural trends, a recent study involved subjecting digitized collections to computational analysis. In what they call *culturomics*, Michel *et al.* (2011) drew upon a dataset of over five million books and 500 billion words published over several centuries to arrive at a range of insights, from the evolution of grammar to the adoption of technology and historical epidemiology. This type of textual analysis features prominently in digital humanities, an increasingly popular area of research that makes use of digital computational tools to gain insight into the humanities.

Many universities offer digital humanities programs, which bring together researchers in a diverse set of fields, including digital technology, humanities, library and information science, and web science. Oxford University has played a major role in the development and use of digital tools for humanities research since the 1970s. The university maintains a website to act as a central information portal for all of the projects involved in the Digital.Humanities@Oxford initiative (Oxford, n.d.). For example, one of these projects employed a variety of quantitative measures, including *webometrics*, to evaluate the impact of online scholarly resources (Oxford, 2012). Webometric methods use information about the number and type of hyperlinks between websites as indicators of the uptake and awareness — and thus, the intellectual impact — of a web resource (Eccles *et al.*, 2012).

As demonstrated by the development of the digital humanities field, digital technologies are a driving force for bringing together scholars in the science and technology realms with those in the arts and humanities. From 2005 to 2008, the Arts and Humanities Research Council (AHRC) in the United Kingdom funded the AHRC ICT Methods Network, which facilitated almost 50 seminars and workshops that involved collaboration among participants engaged in a range of research activities in the digital humanities (e.g., applications for linguistics research, digital restoration, music composition, animation) (Hughes, n.d.).

The field of archaeology provides one example of the way in which digital technologies are helping scholars in the humanities. The Archaeology Data Service (ADS) aims to “collect, describe, catalogue, preserve, and provide user support for digital resources that are created as a product of archaeological research” (ADS, 2014). In archaeology, data creation often requires the destruction of primary evidence, which makes it important to catalogue and provide access to these data. Much of the information collected from archaeology field work remains unpublished and the ADS is working to make it accessible to teachers and researchers (ADS, 2014).

4.4 GENERAL CHALLENGES RELATED TO PUBLIC ENGAGEMENT

One of the major challenges for memory institutions in engaging the public is dealing with a fundamental shift in what they represent because they have been viewed as preservers of resources controlled entirely by professionals. By fully embracing the digital world, some of this control necessarily has to be relinquished. Compared with libraries and museums, archives have been less focused on the needs of the general public, in part because scholars have dominated their user base. However, recent decades have seen an increase in the proportion of users classified as non-scholars; these individuals are seeking information that is easily understood, rather than records or data that require expert interpretation (Huvila, 2008). The more accessible materials are made based on input from the public, the more the public will embrace memory institutions as relevant for society at large.

Memory institutions must decide how they are going to manage the input that they are seeking from non-professionals without losing their status as trusted repositories. According to Stein (2012), this requires a shift in attitude that involves a different view of authority, based on an *authoritative* rather than an *authoritarian* approach. The key to an authoritative approach lies in using the expertise of library, archives, and museum specialists to facilitate access to documentary heritage and provide important contextual information (concepts, facts, and narratives) that helps the public appreciate preservation of culture. Adopting this mindset requires memory institutions to continually demonstrate their importance and let their audience become the “central determiner of value,” instead of simply declaring their significance by virtue of their status (Stein, 2012).

Initiatives that allow the public to contribute experiences and opinions can certainly help to foster what Ed Rodley of the Museum of Science in Boston calls “a more transparent, more engaged” type of authority, where memory institutions are open to “being questioned, being challenged, being called

out” (Stein, 2012). Nonetheless, activities such as user tagging (Section 4.2.1) come with certain challenges. In some cases, a single participant can skew the information that folksonomies provide (e.g., if only a few people have added tags for an online object). As contributions increase, the ability of folksonomies to provide useful search terms that actually improve the process of information retrieval will also increase. However, while this may make user tagging more valuable for the “average” member of the public, over time, the input from minority cultures may be obscured by the contribution of dominant cultures (Saab, 2010; Cairns, 2011).

In discussing the concept of a participatory archive, Huvila (2008) acknowledges that, with user participation, the reliability of descriptions can always be questioned. Nonetheless, an advantage is the less static nature of the archives, which “represents a wider variety of interpretations and viewpoints and can follow more flexibly new directions of research and adapt to novel findings and research results.”

Memory institutions also face challenges in deciding how far they are willing to go in terms of considering the desires of their visitors and adapting to cultural trends. In an article discussing the future of museums, Szántó (2010) states:

As they feel their way toward a digital future, museums need to think deeply about what they stand for: what are they willing to sacrifice for the sake of evolution, and where will they draw the line against technological disruption? [...] Should museum websites aspire to the frenzied hyper-realism of video games, or should they leave that kind of thing to purveyors of popular entertainment?

Nancy Proctor, former Head of Mobile Strategy and Initiatives for the Smithsonian Institution, highlights the major effort required of memory institutions to fully embrace a participatory culture. She discusses the danger of seeking “quick-hit” payoffs by adopting cultural fads rather than undertaking “the much harder, less sexy, but ultimately more sustainable task of radically restructuring our museums and practices” (Stein, 2012). While the former may initiate temporary change, memory institutions must be “suspicious of the fetishization of the new in this period where there is a constant stream of shiny new toys to dazzle us with the promise of starting over in a Brave New World” (Stein, 2012). Instead, an authentic relationship with the public requires the integration of a participatory culture into the daily operations of memory institutions (Stein, 2012).

4.5 CONCLUSIONS

Memory institutions are working to develop new, closer, and higher-value relationships with the public by embracing a participatory culture. In offering new tools and new spaces that allow users to consume and contribute to content, memory institutions are expanding their traditional services and finding new ways to respond to the expectations of stakeholder publics. This, in turn, is helping to redefine their role and ensure their continued relevance in the digital age. Public contributions may involve the completion of simple, pre-set tasks that do not require any background knowledge, or more advanced projects that demand historical knowledge or software engineering capabilities. The public must also be aware and trusting of these participatory activities, which memory institutions can ensure by making efforts to establish meaningful relationships with individuals and communities. The ability to offer opportunities for participation, however, can require substantial resources and internal change on the part of the institution. As challenging and resource intensive as this process may be, internal restructuring will ensure that memory institutions establish sustainable, authentic relationships with the public.

Chapter 5 explores the different ways in which memory institutions can collaborate with each other as well as with external organizations to maximize resources, and Chapter 6 reviews the main factors that support them as they transition towards offering new digital services.

5

Collaborative Opportunities

- **The Benefits of Collaboration**
- **Agreeing Upon Digital Preservation Standards to Promote Standardization**
- **Lifecycle Management of Digital Records**
- **Enhancing Visibility and Capacity for Large-Scale Projects**
- **Building Relationships Between Memory Institutions and Aboriginal Peoples**
- **Sharing and Reusing Digital Material to Enhance Knowledge and Innovation**
- **The Challenges of Collaboration**
- **Conclusions**

5 Collaborative Opportunities

Key Findings

Collaborations can benefit both memory institutions and their users in a multitude of ways, including making core services more convenient for users, reducing the workload for individual institutions, and providing unique opportunities for public engagement that would not otherwise be possible. They are also vital for developing relationships between memory institutions and diverse communities, and for keeping pace with trends and current practices.

Agreement on technical standards for digital preservation and development of open source software that uses these standards encourage institutions to set up similar preservation systems, which stimulates additional collaboration and standardization.

Early collaboration (e.g., through educational programs) between records creators, such as businesses and government agencies, and records preservers can streamline the preservation process.

Collaboration with private companies and academia may allow memory institutions to become involved in exciting activities that enhance their visibility and to undertake large projects that they could not otherwise resource on their own. To protect their own relevance and longevity, memory institutions must approach collaborations assertively and shrewdly.

Solutions to the many challenges now facing memory institutions, as noted in Chapter 3, are increasingly beyond the means of any one institution. This is also often the case for a growing number of services that the public, now comfortably immersed in the “Amazoogole” environment,⁷ has come to expect from memory institutions. Indeed, many of these services are complex to deliver and highly dependent on other memory institutions and related organizations. One example is WorldCat, which exemplifies the potential, and complexity, of major collaborative initiatives. WorldCat receives cataloguing information from 72,000 libraries around the world. In collaborating with Google Books, it has

⁷ The *Amazoogole effect* is a term coined by Dempsey (2005). It refers to the “all-pervasive influence of systems such as Google and Amazon [that] has evoked an expectation of what digital information systems ‘should’ be like: seemingly all-encompassing and entirely simple to use” (Bawden, 2005).

become a resource for both libraries and their users to identify documentary materials from over two billion records and then list the libraries closest to a user's location that carry a given item (Waibel & Erway, 2009; OCLC, 2014c).

This interdependent reality that underpins many of the new digital opportunities makes collaboration paramount if memory institutions are to fulfill growing public expectations and needs and fully realize the potential of the digital age. As Waibel and Erway (2009) state: "While the collections [that memory institutions] manage remain necessarily fragmented in the real world, potential users of these collections increasingly expect to experience the world of information as accessible from a single search on-line." Furthermore, as discussed in Chapter 4, the public is increasingly expecting opportunities to interact with memory institutions by sharing their thoughts, ideas, and experiences through platforms such as websites and social media.

The examples presented throughout reveal the potential for a wide range of cooperative structures spanning from collaborations within memory institutions of the same type, collaborations among memory institutions of different types, and mixed collaborations that may involve a wider set of public and private organizations including libraries, archives, museums, companies, government funding bodies, and non-profit organizations. The first part of the chapter presents these different types of collaborative arrangements in a hierarchy, along with several examples. These collaborations can be orchestrated by memory institutions for the purpose of fulfilling their mandates. Particular opportunities provided by cooperative arrangements that lie at various points along the hierarchy are then explored. The chapter ends with a discussion of collaborations that are not necessarily driven by memory institutions, but participation in these activities is nonetheless important for memory institutions to ensure that they keep pace with broad digital trends. Although these activities may not benefit libraries, archives, and museums in ways that are immediately obvious, they will most likely lead to opportunities in the future that will only be possible if memory institutions remain current in the digital age.

5.1 THE BENEFITS OF COLLABORATION

Collaborations among memory institutions can greatly enhance the efficiency with which they carry out their main functions. Collaborations can make core services more convenient for users, reduce the workload for individual institutions, and increase standardization of policies and digital platforms, facilitating further collaboration. Mixed collaborations, involving memory institutions and external organizations such as software development companies, can accomplish these more practical goals and provide unique opportunities for users that would not be possible without the financial backing of a private institution. For example,

partners such as Google are able to undertake projects that would not be feasible for many memory institutions, giving users the ability to virtually tour museums (Google Cultural Institute) or browse centuries-old documents from their homes (Google Books). Collaborative initiatives also provide an opportunity for smaller memory institutions to increase their exposure. In addition, they are essential for developing and maintaining relationships between memory institutions and various communities. In Canada, for example, Aboriginal communities are collaborating with museums to create culturally sensitive content management systems to support access to their cultural heritage and facilitate self-representation (see Section 5.5).

These advantages of collaborations, particularly formal partnerships, are explored in this chapter with the support of case studies that illustrate how sharing of resources and knowledge can help memory institutions succeed in the digital age. Overall, collaboration enables memory institutions to work at higher capacities while incurring fewer costs, and helps to facilitate networking and outreach. Thus, it can aid memory institutions in simultaneously fulfilling their mandates and satisfying the public by providing services that are convenient and enjoyable.

5.1.1 A Partnership Hierarchy for Libraries, Archives, and Museums

Collaborations can be arranged into a hierarchy based on several criteria, which are illustrated in Figure 5.1. They may involve a single type of institution or multiple types, including private partners; they may include a handful of partners or many thousands; they may be confined to a single city or encompass participants from many countries. Figure 5.1 provides examples of partnerships that fall at various points along this spectrum.

Although not a steadfast rule, partnerships at the top of the hierarchy are often purely digital initiatives rather than digital add-ons to established institutions. This is the case for Europeana, InterPARES, the Reciprocal Research Network, and the Archivemata-as-a-Service of the Council of Prairie and Pacific University Libraries, for example, which are designed entirely for the purpose of delivering or researching digital-based services. Box 5.1 profiles three of the partnerships used as examples in the hierarchy.

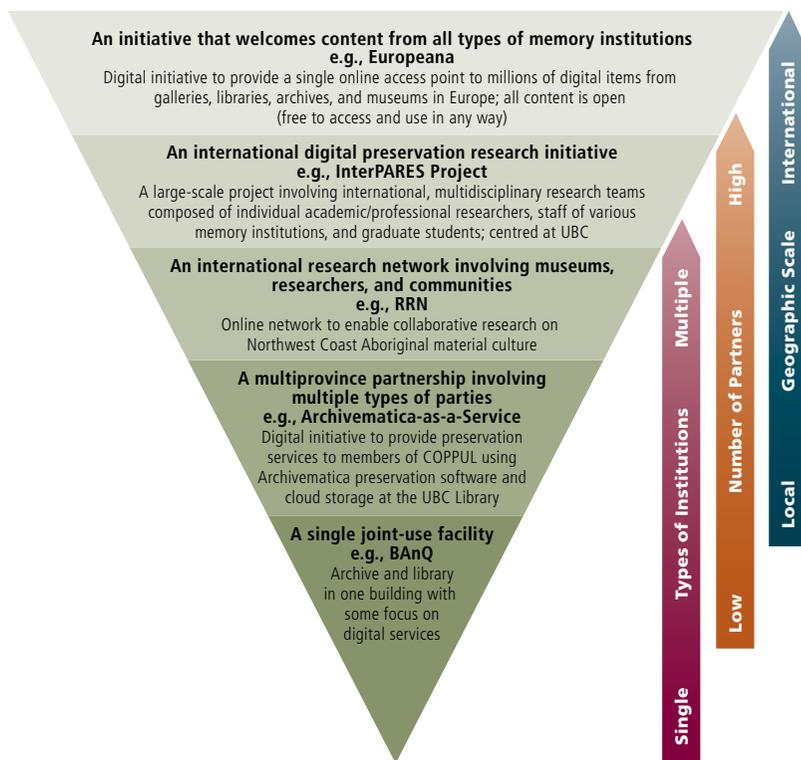


Figure 5.1

Hierarchy of Potential Partnerships Between Libraries, Archives, Museums, and External Partners

Collaboration can take many forms, ranging from formal partnerships within memory institutions of the same type to mixed partnerships that may involve any combination of libraries, archives, museums, companies, government funding bodies, and non-profit organizations. In this figure, partnerships at the top of the inverse triangle involve greater diversity of institutions, have a greater number of partners, and operate at more geographic levels than do those at the bottom tip. Abbreviations: BAnQ (Bibliothèque et Archives nationales du Québec; COPPUL (Council of Prairie and Pacific University Libraries); InterPARES (International Research on Permanent Authentic Records in Electronic Systems); RRN (Reciprocal Research Network); UBC (University of British Columbia).

Box 5.1**Canadian Memory Institutions: Examples of Partnerships****Bibliothèque et Archives nationales du Québec (BAnQ)**

BAnQ was founded with the purpose of making a single government entity accountable for activities that were previously divided among the Bibliothèque nationale du Québec, the Grande Bibliothèque du Québec, and the Archives nationales du Québec. The libraries merged in 2002 and the archives joined in 2006. BAnQ identifies itself as an archives centre, a preservation centre, a large public library, a virtual library, and a cultural beacon (Yarrow *et al.*, 2008). It is currently the largest public library in the French-speaking world (BAnQ, n.d.), and maintains a rich digital collection that includes newspaper archives, civil and municipal records, musical scores, magazines, maps, postcards, and sound and video recordings (Yarrow *et al.*, 2008).

The Council of Prairie and Pacific University Libraries (COPPUL) Preservation Service

COPPUL, an association of mostly Western Canadian university libraries (COPPUL, 2014), is piloting a cloud-based preservation service using the Archivemata digital preservation system (see Box 5.2). The service is offered to member institutions that wish to preserve digital holdings but lack the resources to install and manage local Archivemata instances on their own. In this joint endeavour, COPPUL signs up new institutions and seeds the one-time set-up costs; Artefactual Systems (the lead developers of Archivemata) oversees installation, account and server administration, and technical support; and the UBC Library provides fee-based server hosting and digital object storage service using EduCloud (COPPUL, n.d.).

The Reciprocal Research Network (RRN)

RRN — part of the Renewal Project of the Museum of Anthropology at UBC — is an online tool that allows researchers, communities, and cultural institutions to contribute collections data and collaboratively research Northwest Coast Aboriginal material culture (RRN, 2013a). As of 2014, the network involved 22 institutions (including the Museum of Vancouver, the Royal Ontario Museum, the American Museum of Natural History, and smaller First Nations organizations such as the U'Mista Cultural Society, the Stó:lo Research and Resource Management Centre, and the Musqueam Indian Band) and almost 500,000 digital objects (RRN, 2013c). Researchers can browse collections and create projects with the objects in a private working space where they can initiate discussions with other researchers and curators, use collaborative writing documents, add content to collections records, and upload related files (RRN, 2013b). Liaisons from the co-developer First Nations provided input throughout the development process to ensure that community knowledge and cultural rights would be respected.

As the above examples demonstrate, partnerships on large or small scales can increase efficiency through centralization, enhance convenience for users, disseminate culture, and encourage the development of digital initiatives. A discussion of partnerships would not be complete without the acknowledgement of Europeana as the ultimate model for collaboration. Europeana is used several times throughout this chapter as an example and is highlighted again in Section 6.3.1 as a leading memory organization. Among other opportunities, it has embraced social media, open licensing, advanced web technologies such as Linked Open Data and become “a catalyst for change in the world of cultural heritage” (Europeana, n.d.-c).

5.2 AGREEING UPON DIGITAL PRESERVATION STANDARDS TO PROMOTE STANDARDIZATION

Memory institutions and other organizations are currently contending with the reality that maintaining long-term access to their digital holdings requires a structured digital preservation program. This presents an opportunity for Canadian memory institutions to agree upon national standards for digital preservation.

Memory institutions may create their own systems and standards for digital preservation. As demonstrated by the COPPUL example in Box 5.1, it can be advantageous for a group of institutions to follow the same standards since the burden on each individual institution can be reduced and the given preservation system can be further tested and developed by a larger pool of users. Numerous standards already exist and few of them are broadly used. Thus, the challenge is to work towards implementing existing standards rather than developing new ones. Canada has the opportunity to take the digital preservation strategies and tools that are being developed by various working groups, and amalgamate them into one preservation infrastructure. Ideally, this infrastructure would help to minimize the duplication of resources and support smaller memory institutions by providing them with options if they do not have the capacity to implement digital preservation activities in-house. The end goal of standardization is interoperability and, in some cases, the Panel acknowledges that rigorous standards may not be needed to achieve this goal. However, large-scale interoperability, as opposed to small pockets, will ultimately be aided by agreement upon digital preservation standards.

5.2.1 Challenges in Agreeing Upon Digital Preservation Standards

Once a digital object is ready to be preserved, several fundamental questions related to standardization remain:

1. *What rules and standards should be followed by memory institutions that have accepted the responsibility for preserving digital material?* One of the few universal models for digital preservation is the Open Archival Information System (OAIS) Reference Model, which was developed in the 1990s to manage the long-term storage of digital data generated by space missions. The OAIS was approved by the International Organization for Standardization as an official standard and published as ISO 14721 in 2003, which has since been revised by a 2012 version. The model takes a high-level, general approach to digital preservation and provides a conceptual framework rather than well-defined standards, protocols, and best practices (Lavoie, 2008; Giarretta, 2009; ISO, n.d.). The OAIS does little to specify the precise type or format of information that should be provided to archives, and therefore relies on initiatives that attempt to build on its general concepts. In addition, it is not well suited to the non-static nature of modern publishing.
2. *What are the ideal archival formats for various types of materials?* It is challenging to find a format that will remain usable (because of technological obsolescence) and maintain the essential characteristics of the material. For example, the Portable Document Format (PDF) by Adobe was originally capable only of preserving the visible characteristics of documents, so that they behaved as “electronic paper” (Arms *et al.*, 2014). The PDF/A format was developed specifically for archiving, and involved removal of features, such as unembedded fonts, which require external resources for proper rendering of files. The PDF/A-2 specification allows other files to be embedded within a PDF as long as the embedded files are valid PDF/A files. The next iteration, PDF/A-3, permits the embedding of files of any format and thus does not require that the embedded files be considered archival content. A 2014 report prepared by the NDSA Standards and Practices Working Group examines the challenges that this latter iteration might pose for preserving institutions. The report concludes that use of the PDF/A-3 format could be problematic and would “depend on very specific protocols between depositors and archival repositories, clarifying the formats acceptable as embedded files, and defining a workflow that guarantees that the relationship between the PDF document and any embedded files is fully understood by the archival institution” (Arms *et al.*, 2014).
3. *What are the metadata sets that should be extracted from existing metadata schema to satisfy the needs and purpose of different materials in various types of repositories?* “Preservation metadata” has been broadly defined by the PREMIS (Preservation Metadata: Implementation Strategies) Working Group as “the information a repository uses to support the digital preservation process” (PREMIS, 2005). This information could support the maintenance of viability, renderability, understandability, authenticity, or identity and could therefore include

administrative data (including rights management information), technical data, or structural data (e.g., the names and locations of the files that compose a digital object) (PREMIS, 2005). Various initiatives, such as PREMIS and the Dublin Core Metadata Initiative, have defined sets of core metadata elements that should be linked to, or embedded in, a digital resource (PREMIS, 2005; DCMI, 2013). However, many of these standards are flexible enough that a metadata application profile (a document or set of documents that specifies the metadata used in a particular application) is necessary to satisfy the needs of each community or file type (DCMI, 2009; Vogel, 2014). For example, the Scholarly Works Application Profile was created based on Dublin Core standards to meet the metadata needs of scholarly works such as e-journals and electronic textbooks (Allinson *et al.*, 2007).

5.2.2 Opportunities in Selecting Digital Preservation Standards

There are no simple answers to the questions posed in the previous section. Appropriate archival formats and metadata sets will vary depending on the type of digital material. However, for digital objects that require similar archiving strategies, progression towards more standardized digital preservation will be aided by collaboration among software developers in the preservation community. Open source and community-based software will enable programs to be built upon and shared, thereby encouraging further collaboration and standardization.

Working with Open File Formats and Developing Non-Proprietary Software

Open file formats support a variety of digital objects and have the advantage of being non-proprietary, highly standardized, and developed by a community rather than a single entity. For example, the Open Document Format can be used for spreadsheet, presentation, and word processing files. Files that are preserved in open formats are more likely to remain accessible since the software required to read them will not be affected by licence or patent restrictions. Furthermore, if the software needs to be recreated, the necessary specifications are publicly available (Cunliffe, 2011).

Digital preservation software developed using an open source methodology is advantageous for its creators and for other members of the preservation community. Open source software includes the source code for the program so that it can be changed and shared (in modified or unmodified form) by people in any field for any endeavour (OSI, 2014). It enables software creators to reduce their workload by building on existing open source code libraries. In addition, using open source software allows memory institutions to be transparent about their processes and thus encourages external scrutiny.

If the software is freely available and modifiable, other memory institutions are more likely to use it and subsequently collaborate with the original developers to help improve it (Carden, 2012).

The advantages of open source software are many, but there are also some arguments against its use. In fact, some of the advantages may also be viewed as disadvantages (e.g., community development may lead to lack of central responsibility). These are presented in Table 5.1.

Table 5.1

Arguments for and Against Open Source Software

Arguments for Open Source	Arguments Against Open Source
Can be less costly — Volunteers design the software; no centralized company to collect revenue or pay employees	Can be more costly — More time, money, and effort may be spent in R&D, testing, and usability
Customizable — Implementers can develop the system to do whatever is necessary	Learning curve — Lack of commonality with other organizational products may lead to steep learning curve for staff
Nimble — Adaptations can be implemented faster than typical commercial products with long development cycles (months to years)	Interoperability — Lack of long-term product vision may lead developers down dead-ends; product may be incompatible with other products
Openness — Easy to access source code	Responsibility — Lack of corporate structure means that no party is ultimately responsible if help is needed
Faster update cycle — Bugs and security holes can be patched in-house	Quality — Without a strong reporting structure, no party is responsible for ensuring consistent, well-documented, bug-free code

Franch *et al.* (2013); Duranti (2014)

A caveat for the arguments against open source is that, although smaller initiatives may lack central management, this is generally not the case for larger open source software projects. They may be overseen by a not-for-profit institution, which is the case for the Fedora Project. The Fedora software system, an open source digital content repository service used by hundreds of repositories around the world, is under the stewardship of the non-profit organization DuraSpace, and led by a volunteer steering group (Fedora Commons, n.d.-a, n.d.-b). In other cases, a commercial company may manage the project. An example of this situation is the Evergreen project, which provides highly scalable open source library management software (Evergreen, 2014). In 2007, the original developers of Evergreen founded Equinox, a company that supports and develops Evergreen and other open source library software (Equinox, n.d.).

Other software has an intermediate level of restriction that lies between proprietary and fully open source. Such software may be preferable if an institution is concerned about some of the potential disadvantages of open source software. For example, with shared source software, the creator shares the source code, but the software cannot be modified and used for commercial purposes such as running business operations. Thus, while access to the source code may be useful for designing interfaces to the creator's products, the code cannot be re-used, modified, and shared in the same manner as open source code (Rosen, 2005).

One example of a successful free, open source digital preservation system is Archivematica. The system is managed by Artefactual Systems, Inc. and was developed in collaboration with several interested partners, including UNESCO, UBC, and the City of Vancouver Archives (Archivematica, 2014). Improvements to Archivematica are continually being made based on input from partnering institutions that are implementing the system. See Box 5.2 for a description of Archivematica and its development, from the perspective of the City of Vancouver Archives.

Contributing to Discussions on National Digital Infrastructure Planning
In 2012, Canada held its first Digital Infrastructure Summit, which resulted in the formation of the Leadership Council for Digital Infrastructure (LCDI) (LCDI, 2013c). The LCDI is currently working on developing an advanced digital infrastructure ecosystem for Canada, which includes establishing policies and developing tools, services, hardware, and software for digital research; maintaining skilled personnel; managing the collecting, structuring, standardizing, archiving, and sharing of research data; and fostering collaboration among researchers by expanding research networks (LCDI, 2013b). Although university libraries are among LCDI participants, museums and archives are not officially involved (LCDI, 2013a). Memory institutions will eventually be responsible for preserving and providing access to a portion of the research data that travel through this infrastructure, and thus their input would be valuable. For example, archivists could advance proposals for an integrated archival infrastructure through the LCDI forum (Duranti & Rogers, 2014). This would help to eliminate the division between creation/initial management of new records and preservation/archival management as this separation makes archival preservation more challenging.

Box 5.2**The Archivemata Digital Preservation System**

The City of Vancouver Archives has been instrumental in contributing to the development of Archivemata, a free, open source digital preservation system. After several years of searching for a system, in 2008, the archives received funding from the Olympic Legacy Reserve to help preserve the digital records of the Vancouver Organizing Committee for the 2010 Olympic and Paralympic Winter Games (VANOC) (Bigelow, n.d.).

The workflow for Archivemata was built on the OAIS Reference Model, which uses the concept of information packages. The Submission Information Package (SIP) contains the data and associated metadata that the information producer is transferring to the archives. The Archival Information Package (AIP) is the version that is stored and preserved by the archives and the Dissemination Information Package (DIP) is the version that is made available to users (Lavoie, 2008). The primary goal of Archivemata is to process digital objects, convert them to SIPs, and then apply various standards to produce AIPs with appropriate metadata. The metadata requirements are based on existing standards such as PREMIS. DIPs may be automatically uploaded to any access system, including the International Council on Archives Access to Memory system, also developed by Artefactual (Archivemata, 2013; Artefactual, n.d.).

Archivemata was constructed using existing open source tools, such as the File Information Tool Set created by Harvard University. This allowed developers to avoid a "starting from scratch" approach and demonstrates the power of building upon available open source platforms (Bigelow, n.d.). The software, documentation, and development infrastructure for Archivemata are all available for free, "to give users the freedom to study, adapt and re-distribute these resources as best suits them" (Archivemata, 2013).

5.3 LIFECYCLE MANAGEMENT OF DIGITAL RECORDS

As discussed, one of the major challenges for memory institutions in the digital age is addressing the urgency with which digital records of continuing value must be identified for preservation before they cease to exist or become inaccessible due to technological obsolescence. To achieve this, records need to be managed throughout their life cycle. The UNESCO *Charter on the Preservation of Digital Heritage* recognizes this need and states that long-term preservation should begin at the creation stage for digital information (UNESCO, 2003a).

An important caveat is that this level of management will be difficult — if not impossible — to achieve for records of organizations that do not have a designated archival institution, unit, or program, and for donated records of individuals and families. Since memory institutions will continue to receive material on obsolete media devices and even intact computers, specialized workstations will need to be maintained to access and retrieve the material they contain. These workstations may contain old computers with obsolete drives (e.g., 5.25-inch floppy disk drives) or hardware that has been constructed to allow external drives for outdated media formats to be connected to modern computers using USB ports, and may require digital forensics expertise to identify and authenticate the material (Kirschenbaum *et al.*, 2010). These techniques may be used for initial access of digital data, but long-term preservation requires additional processes such as migration.

Archival institutions could work with the creators of the records, for which they are the designated preservers, on the development of recordkeeping systems that either integrate the creation, management, and preservation of digital records, or allow for a seamless flow of the records from creator to preserver. Furthermore, even when the records are meant to remain for the long term with their creator, especially in the case of smaller organizations, firms, or groups, creators would benefit from guidance from the archival community on the creation and keeping of reliable, accurate, and authentic digital records. This is also a leadership opportunity for government archives, including LAC.

5.3.1 Challenges in Developing Records Management Systems for Digital Records

Despite the fact that electronic records have been a reality for several decades, and that guidelines and software for their management have been developed by national archives, professional associations, and businesses, organizations have been slow to adopt electronic records management (ERM) systems (McDonald, 2005; McLeod *et al.*, 2011).

From 2007 to 2010 McLeod *et al.* (2011) conducted a project to explore the issues contributing to the slow adoption of ERM systems by organizations in several fields (business, health, law, history, information technology systems design, and information management). One finding of the project was the major role of “people issues” (cultural and philosophical attitudes, awareness of ERM, preferences, knowledge, and skills) in hindering the implementation of ERM systems, and the inextricable linkage between people issues and systems/technology. It may be unrealistic to expect users to follow a set of complex, rigid recordkeeping standards that have “no resonance to their reality” and “no obvious benefit to them” (McLeod *et al.*, 2011). A similar project was conducted by the Canadian

team of the InterPARES 3 project, which also found that “different groups of stakeholders have differing understanding and expectations of their roles and responsibilities in recordkeeping,” which can lead to “tension and barriers for the successful implementation of a recordkeeping system” (InterPARES 3, 2013).

5.3.2 Records Creators and Records Preservers: The Potential to Learn from Each Other

To avoid the development of unrealistic digital recordkeeping requirements, it would be beneficial for archival associations to work with government agencies, businesses, universities, individuals, community groups, and software developers on creating record processes that can be integrated into their daily activities. Survey data from the project conducted by McLeod *et al.* (2011) revealed that organizations would appreciate a different approach from records professionals — one that focuses on key outcomes rather than rigid standards and one that clearly demonstrates the benefits of recordkeeping to employees. Users (i.e., the members of the records creating entity) would appreciate the opportunity to collaborate with records professionals early in the development of the processes to ensure that their needs are met.

Another related idea emphasized by McLeod *et al.* (2011) is the importance of training users to do things well enough, rather than strive for perfection. The ever-increasing volume of digital information calls for urgent action; thus, implementation of an adequate plan now, which can be carried out with resources that are currently available, may be more beneficial than implementation of a perfect plan before it is too late (McLeod, 2012).

A literature review undertaken by McLeod *et al.* (2011) suggests that a critical success factor for ERM is the sharing of expertise and lessons learned. This requires the completion of post-implementation system evaluations that focus on the final outcomes of a given ERM system rather than just on specific aspects such as the success of the technology itself.

One way to simplify ERM for staff (and therefore enhance the likelihood of success) is to make it an “organic part of the business process” (Cunningham, 2011). In the current environment, records are often generated using one system, and then moved to another system for management. An evolution of this paradigm would be the development of office software with records management functionality, allowing records and data from core business activities to be created and managed seamlessly. Although such a system is easy to theorize,

it is difficult to implement, and records managers have been striving to do so for decades. Box 5.3 exemplifies one of the many small steps that must be taken to make this type of system a reality. It describes a project undertaken at Northumbria University in the United Kingdom with the goal of training post-graduate students in research data management. The project provides an example of a successful interaction between records creators and records preservers, which was achieved by making data management relevant to common areas of focus for researchers (e.g., methodology and ethics).

Box 5.3

Promoting Research Data Management Skills: DATUM for Health

From 2010 to 2011, members of the health sciences and information management departments at Northumbria University carried out a collaborative project designed to train health studies doctoral students in data management. The project, entitled DATUM for Health, was funded by JISC under the Managing Research Data Programme. The rationale for the program was three-fold. First, there is a general demand for greater availability of publicly funded research data. For example, some funding agencies now require that applicants submit data management plans, which must describe how information will be collected, stored, and made publicly available, and how it might be used for future research (BBRSC, 2010). Second, digital technologies are changing the way research is done and creating new data management challenges. Third, many members of academic institutions lack knowledge and skills in the area of data management (McLeod, 2011).

The program involved four training sessions, two delivered by the university, one by the Digital Curation Centre (DCC, 2014b), and one by the Digital Preservation Coalition. Participants found the training program useful and felt that completion of data management plans should be required for approval of all post-graduate research projects. After training, they were able to recognize how some data management issues are closely linked to research methodology and ethics issues. Members of the DATUM for Health project team concluded that research data management training should be an integral part of post-graduate studies rather than a separate, optional program, and recognized the importance of helping researchers develop appraisal skills to avoid overwhelming repositories (McLeod, 2011).

5.4 ENHANCING VISIBILITY AND CAPACITY FOR LARGE-SCALE PROJECTS

An additional advantage of collaborative projects is their ability to provide individual memory institutions with exposure that they would not be able to achieve on their own. For example, the Art Project of the Google Cultural Institute, which provides a central online access point for digitized photos and artefacts from museums around the world, has allowed smaller museums to have an online presence. Although some of these museums may maintain their own websites, which include digital collections (e.g., the Textile Museum of Canada (TMC, 2014)), casual users may not necessarily be exposed to these collections without a partnership such as the Google Cultural Institute. Formal partnerships, particularly with private companies, can also provide the expertise and financial resources to allow libraries, archives, and museums to undertake large-scale projects that would not be otherwise possible.

Libraries are a leader in large-scale collaboration. For example, member libraries of OCLC cooperatively maintain WorldCat, a collection of over two billion digital resources. OCLC offers a wide range of services that comprehensively address library workflow. Libraries that subscribe to cooperative OCLC cataloguing services have access to the WorldCat database (OCLC, 2014b). They are also eligible to participate in WorldCat.org, which distributes information about their holdings across the Web, allowing users to access it via major search engines, social networking sites, browser toolbars, and other web applications (OCLC, 2014c). This enhanced connectivity allows the delivery of services such as the “Find this book in a library” link in Google Books, which uses information that libraries have provided to WorldCat along with a user’s location to list the nearest libraries that carry a given book (Waibel & Erway, 2009).

By delivering information in new ways, partnerships can also raise the public profile and improve the public perception of memory institutions, which may be viewed as elitist, closed, or traditional (Gibson *et al.*, 2007; Yarrow *et al.*, 2008). As discussed at the 2014 Canadian Archives Summit, archives in particular struggle with a low public profile and a lack of connection with users (e.g., Yorke, 2014). Several examples of partnerships between memory institutions and private companies are highlighted in Box 5.4. These partnerships also present some challenges, which are reviewed in Section 6.2.4.

Box 5.4**Examples of Successful Partnerships**

Brightsolid + The British Library = The British Newspaper Archive: This 10-year partnership between the British Library and Brightsolid will digitize over 40 million pages from the national newspaper collection, the most significant mass digitization of newspapers ever in the United Kingdom. The partnership copyright policy makes the commercial partner take on the costs of digitization in return for being able to exploit these documents commercially, with the commercial partner covering any liability as a result of copyright infringement claims up to £5 million (BL, 2010; BNA, 2014).

BBC + The British Museum = A History of the World in 100 Objects series: This partnership between the BBC and the British Museum ran throughout 2010. During the project, digital images of thousands of historical objects were added to the website by museums and individuals across the United Kingdom. A BBC radio series entitled "A History of the World in 100 Objects" ran 100 15-minute programs, each focusing on an object from the British Museum. To involve schools, lesson plans and other ideas for bringing the project into the classroom were prepared (BBC, 2014).

Flickr + The Library of Congress = Flickr Commons: The Commons began as a partnership between the Library of Congress and Flickr with the release of 3,000 historic images from two of the most popular Library collections. The goals were to increase exposure to this content, harness the knowledge of the public to enrich the collections, and involve other memory institutions in the project (Oates, 2008). Flickr Commons now has over 80 participating memory institutions from around the world, including the Smithsonian (the fourth member to join); the national libraries of Sweden, Norway, Australia, New Zealand, Ireland, Scotland, and the United States; and various archives, museums, research institutes, and historical societies (Kalfatovic *et al.*, 2008; Flickr, 2014). One of the requirements of Flickr is that any material shared on the Commons website has no known copyright restrictions so that others may use and reproduce it freely (Flickr, 2013).

Google + various libraries = Google Books: The Google Books Library Project began in 2004 with Harvard University Library, the University of Michigan Library, the New York Public Library, Oxford's Bodleian Library, and Stanford University Libraries. Google has now partnered with over 40 university and national libraries to digitize their collections into searchable databases. Full access is granted to out-of-copyright texts, whereas brief snippets of copyrighted works are provided (Google, n.d.). Thus far, the project has focused primarily on non-fiction books and documents.

As the examples in Box 5.4 indicate, partnerships are able to help memory institutions place their content into larger, shared spaces that allow for common access points to a variety of material. A partnership may be driven by a memory institution's realization that the new reality in the digital world involves "choosing to go where visitors are and not requiring them to come to us" (Kalfatovic *et al.*, 2008). Enhancing audience interaction with cultural material is not only valuable for users; it can also help enrich the content and educate memory institutions about user needs. For example, Kalfatovic *et al.* (2008) are very positive about their experience bringing material from the Smithsonian to Flickr, stating that "by exposing Smithsonian content within the Flickr environment, the Institution is learning what content is desired by the Web 2.0 world, how to bring crowd-sourcing into professionally curated collections, and how to bring diverse institutional skills together in a collaborative project."

5.5 BUILDING RELATIONSHIPS BETWEEN MEMORY INSTITUTIONS AND ABORIGINAL PEOPLES

The respectful, ethical stewardship of Aboriginal peoples' cultural property depends on the forging of new relationships between memory institutions, especially museums, and Aboriginal peoples. Digital technologies may play a role in this process, but must be understood in the context of shifting practices and relations of power between Aboriginal communities and Canadian museums. In 1992 the Canadian Museums Association and the Assembly of First Nations co-sponsored the *Task Force Report on Museums and First Peoples*, with the mission of developing "an ethical framework and strategies for Aboriginal Nations to represent their history and culture in concert with cultural institutions" (AFN and CMA, 1992). The report was convened in the wake of the Lubicon Lake First Nation's boycott of the Glenbow Museum's exhibit *The Spirit Sings*, which took place during the 1988 Calgary Olympics. *The Spirit Sings* is described in the *Task Force Report* as "a watershed in Canadian museology" that led to the identification of "historical problems in the representation of Aboriginal peoples in museums [and concerted] efforts toward establishing open and lasting partnerships between museums and Aboriginal peoples" (AFN and CMA, 1992).

The three major issues identified by the Task Force were: "1) increased involvement of Aboriginal peoples in the interpretation of their culture and history by cultural institutions; 2) improved access to museum collections by Aboriginal peoples; and, 3) the repatriation of artifacts and human remains" (AFN and CMA, 1992). These issues and the mandate that they bring to contemporary heritage institutions in Canada are further underscored by the Native American Graves Protection and Repatriation Act (NAGPRA), passed into legislation in 1990 by the United States government, which mandates that federally funded institutions inventory and repatriate Native American

human remains, sacred objects, associated funerary objects, and objects of cultural patrimony to their source communities (Trobe & Echo-Hawk, 2000). NAGPRA and the *Canadian Task Force Report on Museums and First Peoples* have facilitated what some in the museum community think of as a “philosophy of repatriation,” which underlies the intentions of many digital heritage initiatives that involve Aboriginal cultural property (Hennessy *et al.*, 2013).

In the early 1990s, digital imaging, database, and search technologies rapidly advanced at the same time that Canadian museums were looking for new ways to implement models of partnership and collaboration mandated in the *Task Force Report*. New technologies provide “unprecedented tools with which to reassemble and create new forms of access” to dispersed collections of Aboriginal cultural objects (Phillips, 2011). In the context of collaborative museology, “remote access can begin to level the playing field by displacing the museum as the unique site for the study of these materials and mediating entrenched hierarchies of privileged access and complicated protocols of permission, vetting, and security” (Phillips, 2011). Digital visual access to collections in memory institutions has been referred to as *digital repatriation*, *visual repatriation*, *knowledge repatriation*, *virtual repatriation*, and *figurative repatriation* (Kramer, 2004; Hennessy, 2009; Christen, 2012; Hennessy *et al.*, 2012; Bell *et al.*, 2013; Krmpotich, 2014).

However, digital visual access to Aboriginal cultural property in museum collections should not be conflated with actual repatriation, even though visual access and use of digital collections data may be the primary goal of some Aboriginal communities (Boast & Enote, 2013; Krmpotich, 2014). The term *repatriation* is currently used “to refer to the transfer of human remains, as well as being used alongside ‘restitution’ and ‘reparation’ to refer to the return of physical objects from museums to individuals, source communities, or nations” (Krmpotich, 2014). The negative impacts that comprehensive removal of cultural heritage by museums has had on Aboriginal peoples in Canada have been widely acknowledged, including in the Royal Commission on Aboriginal Peoples (Phillips, 2011). Further, that the skeletal remains of tens of thousands of Aboriginal ancestors continue to be held in museums around the world causes immense pain to descendant families. Given this context, visual repatriation, knowledge repatriation, virtual repatriation, and figurative repatriation are increasingly being considered as *additional possibilities* alongside physical repatriation of objects and human remains (Krmpotich, 2014).

Digital technologies are allowing memory institutions to share more information with larger audiences by making their collections accessible online. Some of this information is cultural property, which is “material of importance to the cultural heritage of a group of people,” including “artistic, historical, religious,

and cultural objects, as well as songs, stories and dances” (UBC MOA, 2008). Widespread distribution of cultural property over the internet creates opportunities (e.g., potential collaboration between researchers and various communities) but also raises some rights issues (e.g., uncertainties surrounding who has the right to dictate rules regarding restriction or circulation of digital cultural heritage) (Hennessy, 2009).

Digital heritage access projects involve multiple rights issues that must be addressed, primarily related to restriction of access between different members of a cultural community and between the community and the general public. Local protocols for the circulation of cultural information must be respected if a community is provided with online access to cultural material (Hennessy, 2009). Access may be decided based on complex systems that consider age, gender, ritual status, family, and place-based relationships (Christen, 2011). By collaborating with Aboriginal peoples and organizations, developers have created online archives with interfaces that are responsive to these cultural needs (Christen, 2011, 2012; Hennessy *et al.*, 2012). Participatory production processes have been shown to support the articulation of local cultural property rights discourse (Hennessy, 2012) that can be addressed in the development of online archives and databases.

For example, a community may decide that the public should not be allowed to view certain sensitive or sacred cultural information. These privacy concerns can be taken into account when online archives are designed; however, if digitization and distribution occur before communities have the opportunity to assess collections and stipulate restrictions, then information may be made publicly available without their consent. Community leaders may not be able to articulate the restrictions they desire until they understand the implications of new technologies. If restrictions are set after the fact, then they will likely be difficult to control, since copies of images and documents may already be available on other public websites (Hennessy, 2009). These dynamics emphasize that partnerships and collaborations between memory institutions and stakeholder Aboriginal communities are central to the ethical and respectful realization of digitization projects.

Given the challenges associated with the digitization and circulation of Aboriginal cultural property, the opportunities of digital access to cultural heritage are many. Several initiatives originating in the Smithsonian Institution, for example, have demonstrated how digital technologies have allowed people to reconnect with their heritage. The National Museum of the American Indian has engaged in digitization initiatives to collaboratively curate, return, and preserve

historic films from the Heye Collection to the Zuni Nation (O’Neal, 2013). The Smithsonian’s National Museum of Natural History collaborated with the Inuvialuit Cultural Resource Centre in Inuvik, Northwest Territories, in order to return digital records of the Inuvialuit MacFarlane Collection for use in an Inuvialuit-produced virtual exhibit of cultural heritage (Hennessy *et al.*, 2013). The Smithsonian has also collaborated with the Tlingit community in Alaska to scan and digitally fabricate replicas of sacred objects that were physically repatriated to the community. The digital production of replicas in this case facilitated the return of original objects for use in cultural activities, the seclusion of sacred objects according to local protocol, and the ongoing display of replicas in the museum setting (Hollinger *et al.*, 2013).

In Canada, innovative museum, university, and community partnerships are creating opportunities to unite fragmented Aboriginal cultural property in digital spaces. The Great Lakes Research Alliance for the Study of Aboriginal Arts and Cultures, for example, is “a project of reclamation and recovery, reconnection and reintegration” (Phillips, 2011) that brings together Great Lakes items from international museum institutions in a single online database for collaborative research and knowledge exchange. The Reciprocal Research Network (see Box 5.1) was co-developed by the Museum of Anthropology at the University of British Columbia with the U’Mista Cultural Society, the Stó:lo Research and Resource Management Centre, and the Musqueam Indian Band to unite the Northwest Coast collections of over 20 international institutions for reciprocal exchange of knowledge. Both of these initiatives demonstrate a commitment to reconciling Aboriginal and Western knowledge systems and respond to the challenges set out in the 1992 *Task Force Report* to (i) increase involvement of Aboriginal peoples in the representation of their culture and history and (ii) to improve access to collections. However, the third Task Force challenge — to repatriate artefacts and human remains — will remain a long-term project for Canadian museums that digital technologies can support, but not replace.

5.6 SHARING AND REUSING DIGITAL MATERIAL TO ENHANCE KNOWLEDGE AND INNOVATION

Some collaborative activities need to be undertaken by memory institutions not to specifically enhance their core functions, but rather to ensure that they remain up to date with digital trends. These activities will likely lead to future opportunities that will only be possible if memory institutions remain current in the digital age. One initiative that memory institutions can contribute to is the encouragement of data sharing and reuse. By making raw data and images available under open licences, libraries, archives, and museums can

encourage the use of our documentary heritage for new and innovative applications. In addition, participation in the open knowledge movement will allow memory institutions to ensure that they are key players in growing networks such as the Linked Open Data network (see Section 5.6.4), which will likely lead to future opportunities. Another major area to which university libraries in particular can contribute is the development of infrastructure to support research data.

5.6.1 Open Data

Open data are “data that can be freely used, reused and redistributed by anyone — subject only, at most, to the requirement to attribute and share alike” (OKF, 2012). The former requirement describes the obligation to cite the original source of the material and the latter describes the need for users to provide the content under the same or similar conditions as the original (OKF, 2012). Open data is often taken to mean open government data. According to the Open Knowledge Foundation (OKF), there are many types of open data, including cultural data held by libraries, archives, and museums; science data produced by researchers; and government data relating to areas such as finance or statistics (OKF, n.d.-c).

Use of open data cannot be restricted (e.g., it cannot be limited to educational or non-commercial use). In addition to being legally open, it must be technically open — available as a whole (preferably downloadable over the internet) in a convenient and modifiable form, which allows intermixing with other datasets. The data should also be machine readable — available in a format that can be easily extracted by a computer program (OKF, 2012).

The OKF provides a list of licences that conform to its definition of open data (OKF, n.d.-b), which includes several Creative Commons (CC) licences. CC is a non-profit organization that provides a variety of free licences with differing levels of openness (CC, 2013). Some licences specify that the material requires attribution (CC-BY) or share-alike (CC-SA) or both (CC-BY-SA) (OKF, n.d.-b). In 2009, CC launched the CC0 licence, which waives all rights, requiring neither attribution nor share-alike, and placing the material as nearly as possible into the public domain (Peters, 2009; OKF, n.d.-b).

Many online communities, such as Flickr and Wikipedia, use CC licences. The World Bank, which collects data on the state of health, education, the economy, and the environment in countries around the world, adopted an open access policy in 2012. All of the data produced in-house are licensed under a CC-BY

licence (CC, 2012). In addition, the World Bank maintains an open knowledge repository, which provides free access to over 17,000 publications (OKR, 2014). The repository has become a leading provider of scholarly economic information (CC, 2012).

Beginning with pioneering work done by the European Commission in the late 1990s, the creation of economic value has been identified as a benefit of open data (Pira International, 2000; Manyika *et al.*, 2013). Governments and memory institutions are beginning to adopt open data policies in an effort to drive innovation. In some cases, particularly for material that is still covered by copyright, institutions release metadata (e.g., bibliographic information for library records) under an open licence (CC, 2014). In other cases, actual content may be made available. For example, as part of New Zealand's open and transparent government program, the National Library of New Zealand is encouraging reuse of statistical data, bibliographic data, and metadata of various types to provide material for new interpretations and development of new applications (National Library of New Zealand, n.d.). Europeana, which maintains a digital collection of millions of cultural objects from memory institutions all over Europe, released the metadata for its collection under a CC0 licence in 2012. The data are now open for apps developers and other digital entrepreneurs to create innovative apps and games for smartphones and new web services (National Library of Finland, 2012).

5.6.2 Research Data

The research community is also recognizing the value of open data. Scholarly research from academic institutions has a presence in the open data movement through open access journals, public databases, and institutional repositories.⁸

Certain funding agencies, such as the Biotechnology and Biological Sciences Research Council in the United Kingdom and the Tri-Agency in Canada (CIHR, NSERC, and SSHRC) have policies that mandate sharing of research data (BBRSC, 2010; NSERC, 2014). Although the Tri-Agency members have had separate policies for archiving and sharing data for many years (Shearer, 2011), in 2013, they held consultations on the draft of a single policy to be used by all three agencies. The draft — modelled after the CIHR Open Access Policy — requires that grant recipients make their publications freely available within 12 months of publication. This may be accomplished by submitting to journals that offer open access (either immediately or after an embargo period) or by providing free access to research papers through a central or institutional

8 An institutional repository is defined as “a digital collection of an organization’s intellectual output” (CARL, 2014a).

repository. Recipients of CIHR grants must also deposit large datasets into public repositories such as GenBank, a genetic sequence database maintained by the National Institutes of Health (Tri-Agency, 2014). This requirement is advantageous for high throughput scientific methods, which generate vast amounts of data that may be left unanalyzed if they are not made public for mining by researchers (Leonelli *et al.*, 2013).

Clinical trials are another source of unpublished data, and failing to consider this rich source of information may lead to medical decisions that are not based on evidence in its entirety. The Yale University Open Data Access (YODA) Project is aiming to change this situation by forming agreements with companies that allow scientists access to individual patient data from clinical trials (Krumholz *et al.*, 2013). Results of the first YODA initiative, a collaboration with Medtronic, Inc., have already been published and an agreement with Johnson & Johnson, Inc. was formed in early 2014 (Yale, 2014).

Although there are existing public databases for certain types of raw data (e.g., GenBank), other types of research data are not preserved in a standard manner. University libraries are working to set up institutional repositories that can aid academics throughout the different phases of research (experimental design, data collection, data analysis, and dissemination). For example, in 2014, the McGill University Library began working on an institutional repository that is aiming to meet the needs of researchers across various disciplines, each of whom create, process, and manage their data differently. One challenge will be to determine the types of data that are most useful to preserve (e.g., raw versus processed), which will vary tremendously, even for different projects within the same faculty (Riley, 2014).

Larger-scale collaborative efforts to catalogue, describe, and preserve research data have also emerged. For example, the Directory of Open Access Repositories (*OpenDOAR*) maintains an international listing of open access repositories. Staff members extract and assign metadata to each entry so that visitors to the site can search and analyze repositories by location, type of data held, and other attributes. Information in the *OpenDOAR* database is made available to third-party service providers such as search engines (University of Nottingham, 2014). In Canada, the Project Arc Working Group, which held its inaugural meeting in March 2014, is planning the development of a library-based Canadian Research

Data Management Network. The group's goals include the provision of support for institutions to deliver data management plans and the commencement of a pilot to create an ideal model for a research data preservation service (Shearer, 2014).

5.6.3 General Challenges in Dealing with Open Data

Technical Challenges

A primary challenge encountered by users of open data is the process of finding the information that they are interested in within the ever-expanding pool of open data on the Web (Gottron *et al.*, 2013). As Hand (2013) emphasizes, data are only valuable if they can provide information, meaning, and answers. Numerous technical challenges may hinder the transformation of data into answers. Depending on the form of the data, a diverse set of expertise may be needed to convert the data into knowledge (e.g., expertise in a specific subject area combined with skills in computer science) (Leonelli, 2013). In many cases, researchers may be aiming to combine data from multiple sources, which may be difficult due to inconsistent data formats and the need for complex statistical analyses (Poldrack *et al.*, 2013; Ridgway & Smith, 2013).

Legal Challenges

Certain types of data, such as health care data, may be subject to privacy laws. It can be difficult to achieve a balance between protecting the confidentiality of individuals and analyzing medical records for secondary uses (i.e., uses that do not involve treating patients themselves), even if identifying information is removed (Keen *et al.*, 2013). In addition, it may be difficult to determine the resulting licence that is appropriate for a product arising from multiple datasets, all with different underlying licences (Hosking & Gahegan, 2013). CC0 licences are ideal for reusing and combining material in new ways. If a reference to the original source of the material is not required, this helps to avoid complicated attribution chains.

Data Quality Challenges

The advantages of freely using data that others have spent time and money collecting are undeniable, but, as Hand (2013) highlights, the data are only beneficial if they can answer the question that a researcher is asking. Information generated by others under unknown conditions may be incomplete, inaccurate, or difficult to interpret, and this could lead to incorrect conclusions.

Resource Challenges

The goals of freely sharing and reusing data can only be accomplished if several resources are in place. As summarized by Leonelli (2013), scientific data sharing depends on:

the existence of appropriate regulatory, social, and material infrastructures, such as (a) workable databases, guidelines on data donation, and servers located in safe locations where data storage can be guaranteed in the long term; as well as (b) well-coordinated networks of individuals, scientific groups, companies, and institutions that take responsibility for developing, financing, and enforcing those infrastructures and the related instruments, computers, and software.

These issues are also applicable to non-scientific data. Taking these factors into account, it becomes apparent that using open data may require considerable financial resources, both for expensive technology and dedicated infrastructure (Leonelli, 2013). Data sharing requires substantial effort by those who generate the data, and if the perceived benefits are not apparent, then data producers may be reluctant to make this effort (Poldrack *et al.*, 2013).

5.6.4 Harnessing the Advantages of Open Data

Two of the central open data challenges mentioned above involve fostering interest and motivation for individuals and organizations to share their data and, once data have been made available, developing methods that allow individuals to locate and manipulate the data they seek. To stimulate interest and public participation, unique initiatives such as country- and city-wide app contests have been organized in Canada, Europe, and elsewhere. To make web-based open data easier to locate, various organizations (including several memory institutions) are creating a large network of Linked Open Data referred to as the "LOD cloud." These initiatives are discussed in detail below.

Demonstrating the Benefits of Open Data

There is considerable effort involved in open data initiatives. If data sharing is not required as part of a transparency policy (as it is in government), memory institutions and individuals must be motivated to provide their data. This may involve rewarding them or simply demonstrating the societal benefits of open data. Rewards may be more applicable to individual researchers, who are often working in competitive environments (Gorgolewski *et al.*, 2013).

Encouragement of open data in the memory institution community may rely on groups formed by enthusiastic volunteers who are interested in sharing resources and organizing initiatives that demonstrate the power of open data.

One of these interest groups is LODLAM (Linked Open Data in Libraries, Archives, and Museums), which provides current information on the state of open data in the world of memory institutions (LODLAM, n.d.). Another group is the Open Cultural Data initiative in the Netherlands, launched by the Dutch Heritage Innovators Network in 2011. Box 5.5 describes the involvement of the Open Cultural Data initiative in organizing the contribution of cultural data for a national app contest. Other open data achievements in the Netherlands are also highlighted.

Box 5.5 **Open Data in the Netherlands**

The Netherlands is a leader in providing open cultural data and encouraging its reuse through innovative approaches such as contests. For example, the Dutch Royal Tropical Institute and the National Archives of the Netherlands both provided photo collections to Wikimedia Commons, the media depository for Wikipedia, allowing the images to be used freely in Wikipedia articles. In return, members of the Wikimedia community enriched both the photos and their associated data by digitally restoring some of the images and correcting or adding descriptive information (Oomen *et al.*, 2012).

The Amsterdam Museum, the Netherlands Institute for Sound and Vision, the Netherlands Heritage Board, and the Rijksmuseum all released data under open licences. The Netherlands Heritage Board dataset fuelled the Wiki Loves Monuments photo contest, which asked citizens to take photos of historical monuments and provide them to Wikimedia Commons under an open licence (Oomen *et al.*, 2012). In 2011, the Open Cultural Data initiative contacted various galleries, libraries, archives, and museums to request that they make cultural data available for the national Apps for the Netherlands competition. Eight datasets were released and 13 apps were created. Prizes were awarded to three apps made with cultural data, and one of these, an app entitled *Visitory*,* was the grand prize winner (Oomen *et al.*, 2012).

In total, 39 datasets from 22 cultural institutions in the Netherlands have been converted to open data and 40 apps have been created (Open Cultuur Data, n.d.). In addition, a sister initiative has formed in Belgium. According to the Open Cultural Data initiative, “cultural institutions [...] have a wealth of information locked up in their vaults” that should be made available to the public to allow them to “participate in arts and culture in new ways” (Open Cultuur Data, n.d.).

* See <http://www.vistory.nl/>.

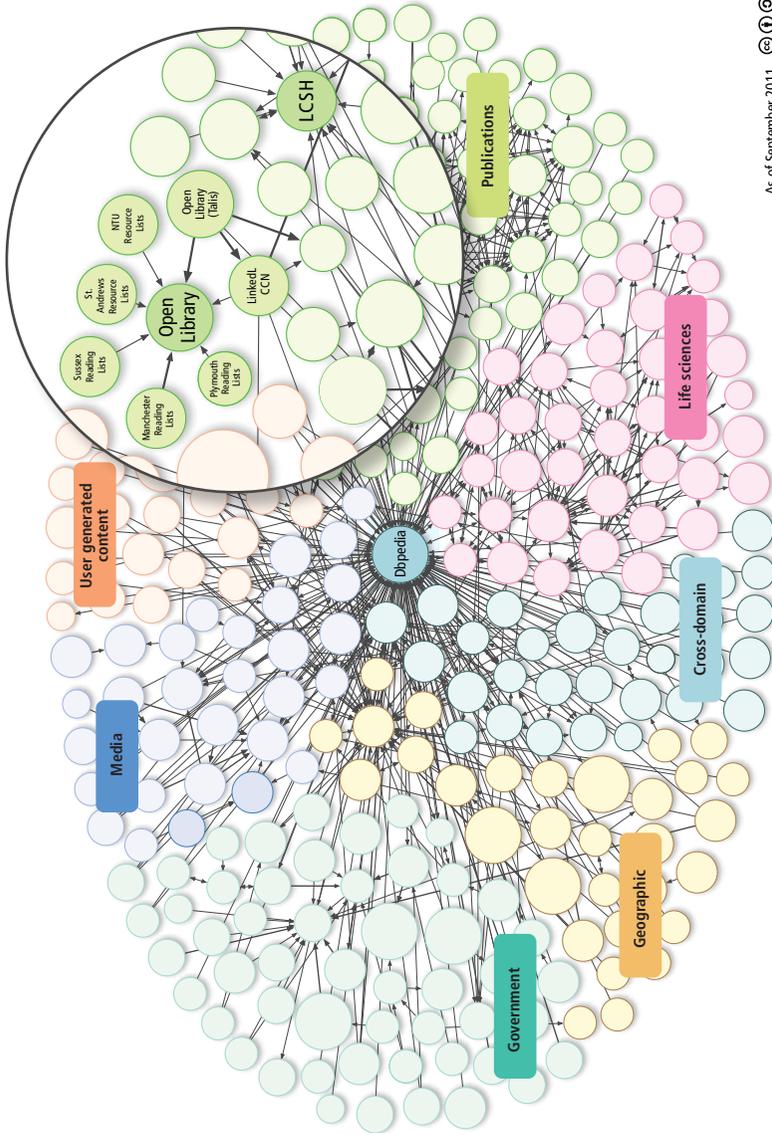
In Canada, the cities of Ottawa, Toronto, Edmonton, and Vancouver have been leaders in establishing open data catalogues. Vancouver launched its website first and subsequently shared the work that it had done to establish a licensing system with the other cities (Giggey, 2012). Ottawa and Edmonton have hosted contests, challenging citizens to create apps using their open data catalogues (City of Edmonton, 2010; City of Ottawa, 2014b).

Linked Open Data

Some of the technical challenges involved in locating the right information in the Web-based pool of open data may be addressed using the “Linked Data” methodology recommended by the World Wide Web Consortium (W3C). In its current form, the Web is easily read by people; the purpose of Linked Data is to create a web of data that are machine readable (Igata *et al.*, 2014). Adding this machine readable information to web pages allows them to be processed by a variety of applications or displayed in an enhanced format by search engines. Thus, information on specific topics may be aggregated and datasets may be enriched by linking them to other datasets (W3C, 2014). Overall, this facilitates the creation of large information networks; as mentioned in Section 2.2.1, this web of linked data is referred to as the *Semantic Web* (W3C, 2013b).

When the linked data methodology is applied to open data, it is referred to as *Linked Open Data* (LOD). The W3C and the Semantic Web Education and Outreach Interest Group are currently engaged in the Linking Open Data community project, which aims to create a massive network of open data that allows users to navigate from source to source using a Semantic Web browser (W3C, 2013a). The state of the LOD cloud as of September 2011 is shown in Figure 5.2. The “nucleus” at the centre of the LOD cloud is DBpedia, which is essentially a version of Wikipedia in Linked Data format. Many data providers include machine readable links from their data to DBpedia (DBpedia, 2013).

Memory institutions are beginning to realize the value of becoming a part of the LOD network. For example, the Library of Congress Linked Data Service uses LOD principles to make various datasets, such as catalogue data, available to other search engines (LOC, n.d.-b). Collections may be searched by subject using Library of Congress Subject Headings, represented as “LCSH” in the LOD cloud (Figure 5.2). Other libraries that use LCSH are able to link users to information at the Library of Congress. Open Library provides access to over one million free ebooks, and the course reading lists for several universities are linked to this resource (Figure 5.2). In the Netherlands, the Amsterdam Museum was the first museum to provide its entire collection in Linked Data format to make it part of the LOD cloud (Oomen *et al.*, 2012).



As of September 2011

Data Source: Cyganiak and Jentzsch (2011)

Figure 5.2

The Linking Open Data Cloud Diagram

In the Linking Open Data cloud diagram, each node represents a dataset published in Linked Data format and each arrow represents links between items within the datasets. The thickness of the arrow corresponds to the number of links, and bi-directional arrows indicate that the datasets contain outward links to each other. Datasets are colour-coded and grouped by domain (e.g., government, life sciences). To create the diagram, a liberal view of open is taken (i.e., it incorporates data that are not behind an authorization check or paywall, even if the data are not published with an explicit licence). To be included, data must be published according to Linked Data principles and added to the Datahub, a free management platform from the OKF (Cyganiak & Jentzsch, 2011; Jentzsch et al., 2011; OKF, n.d.-a). Two memory institutions that are part of the LOD cloud are highlighted in the figure and others are discussed in the text.

In an effort to make their data public, easy to find, and easy to reuse, the U.K. government has created a central access portal, data.gov.uk, which is also included in the LOD cloud. Open data from government departments, other public-sector bodies, and local authorities are available through the site (U.K. Government, n.d.). The portal is run by CKAN (Comprehensive Knowledge Archive Network), an open source data management system created by the OKF. CKAN is used by numerous organizations around the world that are aiming to make their data open and available (CKAN, n.d.).

In March 2011, the Government of Canada launched an open data portal, data.gc.ca. An updated version powered by CKAN was launched in June 2013, which introduced the new Open Government Licence, allowing unrestricted data reuse (GOC, 2011; CKAN, 2013; GOC, 2013a). Various cities and districts throughout Canada have launched their own open data websites (GOC, 2014c), including the City of Ottawa, which also uses the CKAN platform (City of Ottawa, 2014a).

Europeana, a leader in embracing digital opportunities, is currently running an experimental LOD pilot. As mentioned, the metadata for all objects in the Europeana collection are open, and in October 2012 a subset of these data was transformed into linked data (Europeana, n.d.-b). Europeana views this as a way of integrating European culture into the LOD architecture, and recognizes that, although it may involve relinquishing some autonomy, it also ensures that Europeana will be embedded in the ultimate interoperability framework, the World Wide Web (Gradmann, 2010). Europeana is discussed in greater detail in Section 6.3.1.

5.7 THE CHALLENGES OF COLLABORATION

The benefits of collaboration are many, but it is not always a simple process. When different types of memory institutions attempt to collaborate, the challenges can extend far beyond the interoperability issues discussed in Section 5.2. Furthermore, some caution must be taken by memory institutions when they partner with other organizations to ensure that they receive recognition for their efforts.

Collaboration among memory institutions of different types may be hindered by differing professional cultures. Individuals may feel that their expertise is not respected or that the complexities of their work are not recognized by those in other fields. Conflicting philosophies may also create difficulties. For example, archives may be more concerned with security and protection of

materials, whereas libraries tend to focus on making materials accessible; thus, if a library and an archives converge, each may have a different view on how much freedom their visitors should be given (Duff *et al.*, 2013).

When partnering with organizations such as private companies, memory institutions can receive maximal benefits if they view their holdings as valuable assets and make every effort to approach partnerships assertively and shrewdly. If a memory institution offers raw material (e.g., census data) to a private company, which uses the data to create a unique, effectively marketed product, the partnership may not be mutually beneficial. Over time, the company may enhance the data, in part by harnessing participants to provide annotations and corrections, so that it becomes the primary reference source for the information rather than the original donor (O'Reilly, 2007).

For example, to create Ancestry.ca, Ancestry, a private, for-profit genealogy company, partners with various institutions holding family history records pertaining to Canada (e.g., LAC, the National Archives in the United Kingdom, and the City of Ottawa). The company works with an archives' existing content or digitizes paper and film records, and then provides a copy to the archives for free in exchange for the licence to publish the material on its website. For a monthly or annual fee, patrons of Ancestry.ca can search historical records and build their family trees (Ancestry.com, 2014; Anderson, 2014). Ancestry's partners are listed on its website, but the providers of individual records are not acknowledged (Ancestry.com, 2014). Thus, although the digitization of some of their holdings at no cost may well be beneficial for memory institutions in this arrangement, parting with their raw data and receiving minimal visibility is not ideal.

In contrast, organizations such as Wikipedia credit each photo to the donating institution. When the German Federal Archives (Bundesarchiv) provided photos to Wikimedia Germany under a CC-BY-SA licence, its contribution was made clear on Wikipedia and traffic to the Archives website reached an all-time high (Schindler, 2009). Thus, to avoid being taken advantage of, and to protect their own relevance and longevity, memory institutions must use partnerships effectively.

5.8 CONCLUSIONS

This chapter has discussed multiple ways in which memory institutions can share resources to benefit themselves and their users. The more collaborative tactics a memory institution uses, the more likely it is that it will successfully tackle the challenges involved in adapting to the digital age. Collaborative initiatives can vary in scope. They may occur within memory institutions of

the same type, among memory institutions of different types, or be mixed collaborations that involve memory institutions and private organizations or academia. Collaborations have the potential to result in long-lasting, mutually beneficial relationships. Those that involve private organizations are particularly helpful for completing projects that might seem financially and logistically overwhelming. They allow memory institutions to gain exposure through unique digital interfaces that significantly enhance audience interaction with cultural material. Collaborations between memory institutions can considerably reduce the workload for individual institutions. Central organizations can act on behalf of a group of memory institutions to coordinate administrative details or provide a central access point for information. Adapting to the digital age may seem daunting, particularly for smaller institutions, and joining or catalyzing collaborations can make the process more feasible.

Agreement on technical standards for digital preservation and development of open source software that uses these standards encourage memory institutions to set up similar preservation systems, which stimulates further collaboration. For example, if multiple memory institutions are using a common, open source platform, it becomes easier to improve the original design through suggestions from numerous sources. The challenge is to focus on implementing existing standards rather than developing new ones.

Memory institutions will eventually be responsible for preserving the digital records that governments and businesses create. If collaboration between these entities begins early (i.e., at the time of records creation), preservation processes can be planned and streamlined. Educational programs and software systems that allow records creators to become records preservers, for as long as they must hold on to their records, can aid in this endeavour.

An integral concept to the success of many of these collaborative strategies is openness. If programmers make their software open source and if memory institutions release data under open licences, knowledge sharing, innovation, and further collaboration can be enabled. The scientific community, and eventually the public at large, can also benefit from sharing of research data. This requires collaboration with university libraries, which are currently working to develop improved support networks for data management and dissemination. Participation in open data initiatives is important for memory institutions to ensure that they keep pace with broad digital trends. Finally, memory institutions must approach partnerships assertively and shrewdly to receive maximum benefit and to protect their own relevance and longevity.

6

National and Institutional Factors Supporting the Realization of Digital Opportunities

- **Towards Realizing Digital Opportunities Through Institutional Change**
- **Organizational Factors Supporting Digital Change**
- **National Factors Supporting the Realization of Digital Opportunities**
- **Conclusions**

6 National and Institutional Factors Supporting the Realization of Digital Opportunities

Key Findings

In recognizing that the status quo is not acceptable, memory institutions can respond to the digital era by either adding digital services to current services and systems or by transforming operations to fully take advantage of digital technologies and related opportunities. The choice is institution specific and depends on a range of external and internal factors.

Institutions looking to implement or augment digital initiatives need to build a capacity to continually adapt and change. Eight organizational factors are identified as being relevant to supporting such change. These include the prioritization of digital opportunities by senior management, the promotion of standardized ICT infrastructure, and managing Canadian and global copyrights effectively.

An outward focus on users and on potential partners can help memory institutions realize the considerable number of collaboration-based opportunities identified in previous chapters. To this end, an "open innovation" approach can be helpful, whereby users are engaged in a direct dialogue on service development from the very early stages onwards.

Examples from other countries suggest that the capacity to realize digital opportunities can benefit from bottom-up leadership, with memory institutions leading by example, and top-down leadership that can address collective challenges. Legislation is also relevant to the extent that it promotes digital records creation, recordkeeping and preservation, as well as shared digital infrastructure that can be leveraged collectively by multiple memory institutions and heritage groups.

This chapter examines factors that can support memory institutions, individually and collectively, in responding to the opportunities set out in Chapters 4 and 5. Many important factors are at the institutional level; others are at the national level. In combination, they can support change and help realize digital opportunities. The chapter begins with a discussion of managerial issues that can arise when memory institutions consider the scope of change required.

6.1 TOWARDS REALIZING DIGITAL OPPORTUNITIES THROUGH INSTITUTIONAL CHANGE

That memory institutions face significant management challenges in adapting to the digital environment is underscored in a 2010 study of risks facing research libraries. The study, published by the Association of Research Libraries, identifies

26 risks in consultation with senior management from 15 member institutions who rated them on the basis of impact and likelihood. Of these, 10 are ranked in the highest category of near-certain risk with catastrophic impact, whereby organizations would not likely survive in present form or would sustain serious losses in users or value (Michalko *et al.*, 2010).

While these risks, presented in Table 6.1, are specific to research libraries, many are likely to resonate with other types of memory institutions. The authors observe that half of those risks rated as high pertain to: human resource issues, reflecting challenges associated with an organizational culture that inhibits innovation; a lack of critical skills for managing users, data, and technology; uncertainties about the appropriate qualifications for library managers; and difficulty in attracting and retaining staff. They also note that none of the risks related to copyright rated above medium in severity, indicating that libraries do not perceive this issue as an immediate threat to core operations (Michalko *et al.*, 2010).

Table 6.1

Examples of Severe Risks in Achieving Objectives of Research Libraries, by Category

Value Proposition: A reduced sense of library relevance from below, above, and within
Availability of online information resources (Google, etc.) weakens visibility and value of library
User base erodes because library value proposition is not effectively communicated
Human Resources: Uncertainties about adequate preparation, adaptability, and capacity for leadership in face of change
Recruitment and retention of resources are difficult due to reduction in pool of qualified candidates
Identifying candidates for evolving library management roles is difficult
Human resources are not allocated appropriately to manage change in the current environment
Current human resources lack skill set for future needs (changing technology, etc.)
Conservative nature of library inhibits timely adaptation to changed circumstances
Legacy Technology: Managing and maintaining legacy systems is a challenge; replacement parts are hard to find
Library cannot adjust fast enough to keep up with rapidly changing technology and user needs
Increased inefficiencies and expenses result from a lack of functionality of legacy systems and IT support
Due diligence and sustainability assessment of local or third-party services are not completed, tracked, or analyzed

Michalko *et al.* (2010)

The table lists 10 risks that can adversely affect the achievement of research library objectives, which were rated as being both high in likelihood and most severe in impact. The risks are organized thematically.

The risks listed in Table 6.1 are related to both internal constraints and external trends. Internally, memory institutions may consider (i) charter mandates that necessitate a continuation of traditional activities related to non-digital heritage and, for archives, government requirements for making, managing, and preserving public records; (ii) current fiscal realities facing most memory institutions and expectations that activities are of value for money; and (iii) capacity to change. This latter constraint takes into account the fact that, while the digital world is evolving rapidly and constantly, institutions (especially large and well-established ones) change slowly and may depend on a certain amount of stability. With a long-term outlook (i.e., permanent preservation), memory institutions have also developed working traditions that are at odds with the growing need for change within organizations (de Niet *et al.*, 2010). This dynamic of external change and the internal need for stability represents what the Panel calls a *change gap* or *adaptation gap*.

Several external trends also factor into decisions on how best to respond to digital opportunities. These include the pace of technological change and the new functionalities that technology brings, trends in user expectations and associated demands, and the landscape of external actors that can be engaged through collaborations to realize new opportunities.

This internal and external context, the Panel notes, brings forward some fundamental management questions that recognize that rapid and systemic change can be difficult and at times unwise in relation to the digital world, unless there is wide agreement and resources. These questions include the following: To what degree and in what manner should memory institutions adapt to the changing digital landscape? To what extent should they continue what they are currently doing?

The answers to these questions give rise to a continuum of institutional responses to the digital environment. At one end, digital services are added to current services and systems only minimally with the goal of improving accessibility to collections through digital technologies while keeping the physical collection easily accessible. At the other end is a complete transformation of operations that allows memory institutions to fully take advantage of digital technologies and related opportunities (de Niet *et al.*, 2010). In making the transition, they face a number of management challenges. Management and staff of memory institutions are often stretched and even overworked, and have little time or latitude to grapple with adaptation to digital realities. Most will not have the experience or expertise in the area. In-house dedicated personnel are typically

necessary, even when outsourcing digital planning or operations. The world of digital technology and its related uses are not only changing quickly, but are doing so on an upward curve.

Any institution embracing effective uses of digital means needs to build in a capacity to continually adapt and change. For most, building capacity involves formal partnerships. Where memory institutions are unable to adapt or retrofit, or where they are not able to do so rapidly or as a constant matter of course, they may seek such partnerships in the delivery of certain digitally based functions and services (discussed in Chapter 5), thereby closing the change gap (Figure 6.1).



Figure 6.1

Pathways for Responding to the Digital Age

Partnerships are central to filling the change gap that can arise between a memory institution's internal capacity to change and the external opportunities.

6.2 ORGANIZATIONAL FACTORS SUPPORTING DIGITAL CHANGE

The literature identifies a number of necessary actions to create the capacity of memory institutions to pursue digital opportunities. Eight of these actions are discussed below with the goal of giving memory institutions guidance in pursuing the degree of change desired. These are prioritizing digital opportunities, developing new business models for these opportunities, promoting a standardized and generic information and communications technologies (ICT) infrastructure, managing partnerships, managing outsourcing, managing the cloud, managing the various copyrights, and developing human resources.

6.2.1 Prioritizing Digital Opportunities

In preserving documentary heritage and making it accessible, memory institutions are engaged not only in matters relating to the collection, management, and storage of knowledge-based artefacts and materials, but also in the sharing of this knowledge and in the corporate realities of the institution, including finances and financial management. The relative degree of importance given to collection and management as opposed to access/sharing is a matter of policy, but is influenced also by relative costs. This is also the case for investments made in digital opportunities. As de Niet *et al.* (2010) point out, memory institutions that follow a hybrid path and continue to maintain physical collections must continuously make policy-related decisions on whether to invest in physical or digital services and infrastructure.

Indeed, pursuing digital opportunities brings with it new material and administrative costs (especially in the initial set-up) and can require organizational change. Sharing content with the public is in principle enhanced through new digital means and may be seen as a new opportunity to reach beyond the physical walls of memory institutions to a larger public. National memory institutions are meant to serve the public at large and not only users within reach of the castles and fortresses built to house the documentary heritage. Digital technology in this case provides the means to do so. However, organizational, expertise, and cost implications for making the necessary investments in digital capabilities may be opposed by those in the same organization who are responsible for the plant structures built in the last century but that have served us well.

Memory institutions seeking to digitally upgrade operations and services need to justify this expense in the context of competing interests, at least three of which are shown in Figure 6.2. Most importantly, however, from a business case perspective, the upgrade needs to be seen as more than *cost* within the system. It must be positioned as a solution serving primary interests, not the least of which are *revenue* and funding generated directly or indirectly in the short or long term. Making this transition and permanently achieving a shift to the digital realm therefore require strong support at the executive level. The transition can also be facilitated by linking an organization's mission and its vision on digital services (de Niet *et al.*, 2010).



Figure 6.2

Making Space for New Digital Opportunities

This figure, developed by the Panel, distinguishes the core functions of memory institutions — service to public, collection activities, and corporate activities — as being primarily in the service of knowledge. Within this framing, pursuing digital opportunities puts pressure on other core functions and therefore needs strong senior support to succeed.

6.2.2 Developing New Business Models

The opportunities identified in Chapters 4 and 5 require more than institutional prioritization of digital initiatives if they are to be implemented. They require a rethinking of how digital technologies can enhance the value of services that memory institutions have on offer, and an understanding of how these opportunities affect the institution at an organizational level and from a revenue standpoint. Moreover, the viability of new business models varies significantly by type of memory institution; for example, new revenue options suitable for museums are unlikely to be transferable to libraries or archives.

In fact, the opportunities for enhancing public engagement in museums (see Chapter 4) may require decisions on which services are to be *open* such that use and reuse of digital works are left uncontrolled, and which services are to be kept closed and controlled (de Niet *et al.*, 2010). With respect to distribution, these opportunities may also require a shift to viewing online platforms as the primary distribution channel as opposed to the building itself. This can have implications for how common spaces are used.

Many of the new opportunities also require recognition of the broader pool of users that comes with online distribution and an understanding of their needs and expectations. From this standpoint, memory institutions may serve more than one constituency. For those with public mandates, the first constituency is the government (through appropriate departments), which serves the public good, not for financial return necessarily but for the betterment of Canadians. This ethical vision may or may not correspond directly to express demand from the public. The demand is from government itself in part as a result of perceived public demand, but also of its own mandate to serve the public interest.

A second constituency relevant to all memory institutions is made up of users, lay and professional, both of which may demand certain products. These users — which can include those in the creative industries, teachers, research practitioners, and specific public user groups — have their own range of interests that may or may not be consistent with or served by the offerings of memory institutions serving a wider public interest. A major driver of traffic to memory institutions, for example, is the demand for ancestral information. In North America, genealogical users make up 50 to 90% of all traffic through memory institutions' public portals (Tucker, 2007; Creet, 2011). LAC, too, has made genealogy one of its institutional priorities by collaborating with the U.S. genealogy giant Ancestry.com (LAC, 2007b). Ancestry.com has noted that baby boomers are a major and growing demographic in their user base (Kidd Stewart, 2011), which has over two million subscribers as of July 2012 (Ancestry.com, 2012). The public's interest in digitally available ancestral information is only likely to grow as more and more baby boomers retire and take up genealogy as a hobby. By understanding their needs, memory institutions stand to increase this user group's engagement with online collections through genealogy-tailored portals, for example, or easier access to searchable public records such as immigration logs and cemetery rosters as well as birth, marriage, and death certificates.

These new business models bring the potential for new sources of revenue. Today, the primary source of income for most memory institutions, aside from user fees and merchandizing, is government funding. The continued availability of these funds ultimately relates to the success of the institution in fulfilling its mandate in the public interest, as assessed through evidence of demand for the service and the serving of that demand. It is also partly a matter of justifying how perceived public long-term interest will be served apart from any matrix of measured outcome. Each institution therefore needs to corporately justify the costs and benefits of embracing the digital age, which can involve new revenues from digital services.

Box 6.1**Approaches to Monetizing Digital Opportunities**

The following five approaches to monetizing digital opportunities, described as umbrella models by de Niet *et al.* (2010), are not intended to encompass all possible approaches or be universally applicable to all types of memory institutions. It is recognized, for example, that not all government institutions are permitted to receive funds.

Original: The heritage institution creating the experience — Digital access is provided to physical collections as a way of enhancing the profile of a memory institution and increasing the number of visitors seeking an authentic experience with original works.

Digital original: The heritage institution as a digital heritage broker — Digital collections are promoted as the raw material to be used by third parties in new creative work. Revenue comes from licences for the use or reuse of the digital collection or from copyright transfers. In cases where memory institutions do not own the copyright, they can act as brokers for the rights holder, and may receive a percentage of the revenue generated from the rights as compensation for the services provided.

Digital curator: The heritage institution providing the context — Memory institutions develop services around the digital content, by tapping the institution's expertise as a source for potential revenue. This can include offering online courses that explain painting techniques used in a collection, or that cater to professional groups such as archive researchers. It can also involve developing digital services to enhance the experience of the physical collection.

Digital branding: The heritage institution creating the reputation and building the brand — The digital collection, by this approach, is used to promote and develop the brand and reputation of the memory institution, which is then leveraged for income generation. Revenues can come from sponsorship and advertising, a "friends-of" relationship structure that provides resources or donations to the institution, or crowdfunding for a creative artist attached to the institution.

Product bundle: The heritage institution as the provider of product bundles — This last approach bundles together the sources of income from a combination of the above approaches either from within a single memory institution or from two or more memory institutions with the goal of enhancing the value proposition made to consumers.

In their exploration of revenue options related to digital services, de Niet *et al.* (2010) state that the starting point should be the users rather than the collection itself: “Once the value that customers are looking for becomes clear, services can be adapted to it.” While the number of users may or may not be a criterion of success for the memory institution in its service or growth, the greater the number of targeted users, the easier it is to demonstrate the efficacy of the service in fulfilling its mandate — and the greater the potential for revenue from digital services. Box 6.1 outlines different approaches that memory institutions can consider when looking for income from digital opportunities.

6.2.3 Promoting a Standardized and Generic ICT Infrastructure

Over the years, memory institutions have pursued digital initiatives often on a project by project basis, which then become absorbed as part of the institution's ICT infrastructure. The result, however, is often a jumble of different ICT systems — new, old, sometimes outdated, and not always well connected — that affects the quality of the digital services on offer (de Niet *et al.*, 2010). Even among institutions that have digitized collections, online access can be limited, often due to technical interoperability challenges. Along with continuous investment in keeping infrastructure up to date, these issues can be addressed with greater emphasis on technical standardization and the use of generic technology, both of which can further promote value creation and cost savings.

From within an institution, standardization, especially in back office functions such as communication protocols and data modelling, can promote a consistent online presence, automatically link information, and help avoid the need for specific and costly knowledge to maintain interoperability between systems. It can also promote diversification and uniqueness online by giving flexibility in the use of information by users and the institution itself (de Niet *et al.*, 2010).

Finally, through the use of open standards, standardization facilitates collaboration and can promote high-quality links between various services and across institutions. Generic ICT can also promote the value of digital services and minimize the requirement for detailed knowledge of ICT that was once necessary to support large-scale digital services. These technologies, which include APIs, Web 2.0, and cloud computing services, promote the use and reuse of digitally accessible documentary heritage, adding value in the process.

6.2.4 Managing Collaborations

Collaborations face a wide range of challenges, such as incompatible ICT infrastructure, cultural differences, resource constraints, and, in some cases, interinstitutional rivalry that can deter memory institutions from taking the initial step (Waibel & Erway, 2009). Institutions may also be reluctant to step forward, due to the work, financial risk, and responsibility that the position may entail. They may be hesitant to work together if it is not clear what the advantages are.

Additional challenges may arise due to cultural disparities between different types of memory institutions. These may be particularly relevant for formal partnerships that involve more than one type of memory institution, but can also affect whether the lessons learned by collaborative initiatives in one sector are applicable to another (Gibson *et al.*, 2007).

In reviewing reasons why collaborative projects among library, archives, and museums were not pursued, Zorich *et al.* (2008) find other barriers. These include projects not being of great enough importance to the institution in light of more pressing issues, the project being too large and beyond the purview of the institution, or a project idea being too overwhelming and mired in too many issues to be viable, despite its importance. The authors therefore propose that collaboration projects be developed and evaluated on the basis of a collaboration continuum that recognizes that the degree of investment, risk, and benefit increases with greater convergence. As depicted in Figure 6.3, the continuum begins at the contact stage, when prospective partners initiate discussion to identify commonalities and foster a foundation of trust. It finishes at a convergence stage, whereupon a project matures into established infrastructure and its collaborative origins are no longer recognized because the collaboration has become engrained among partners and other stakeholders.

Projects that reach the latter two stages pass through a transition point, becoming transformative in nature rather than additive. As Waibel and Erway (2009) write, in summarizing discussions from a series of Research Library Group workshops on the topic, “cooperation and coordination are additive — they don’t change institutional behaviors, but layer on top of existing processes and structures. Collaboration, on the other hand, is transformative.”

Successful collaborations, especially those that involve the internet, are also user-focused. To this end, de Niet *et al.* (2010) recommend that memory institutions adopt an “open innovation” approach, whereby users are engaged in a direct dialogue on service development from the very early stages onwards. This is



Source: Zorich et al. (2008)

Figure 6.3

The Collaboration Continuum

This figure highlights different degrees of collaboration that underpin many digital opportunities ranging from initial contact between prospective partners, where commonalities are identified and trust developed, to full convergence, whereby projects have matured to the level of shared infrastructure. In between rests a cooperation stage, whereby partners agree to work informally on projects with small but tangible benefits; coordination, where partners engage in shared activities, with clearly defined roles, timelines, and deliverables; and collaboration, at which point shared understanding of the project is reached along with the necessary changes required by each partner to bring about transformational change.

something, the authors add, that is not often done until testing phases, at which time institutional staff have already reached a conclusion about how the collection should be viewed without considering their core user constituencies.

Successful collaborations can also be fostered with catalysts present early on in the relationship. Waibel and Erway (2009) point to five such catalysts that were deemed to apply across the different types of memory institutions. These catalysts are summarized in Box 6.2: Vision, mandate, incentives, change agents, and mooring.

Even with these catalysts, collaborations are not without risk. Walker and Manjarrez (2003) identify four sources of risk when partnering with other memory institutions either within or across types. The first pertains to *capacity* and whether partners have the ability to perform agreed-upon tasks. Another is *strategy risk*, whereby projects do not proceed as intended due to unforeseen investments, for example. There is also risk associated with *partner commitment* over the course of the project, with changes brought about by senior management midway, affecting the commitment levels of staff. Finally, the authors recognize risk associated with *partner compatibility*, where strengths and weaknesses of partners do not balance out. This risk is echoed by Gibson et al. (2007), who cite domination by the larger partner as a common problem. Walker and

Box 6.2***Catalysts for Collaboration***

Vision: To succeed, a collaborative idea must be embedded in an overarching vision shared by all participants. The vision motivates participants to overcome any challenges. If a collaboration fails, the vision itself still remains. Participants can then regroup to strategize about a new effort.

Mandate: A mandate can create enthusiasm for collaboration. It can be communicated formally through strategic plans or high-level directives, or informally. The lack of a mandate can cause uncertainty about administrative backing, which can dominate discussions and undermine activities.

Incentives: Staff and departmental appraisals should include collaborative activities, with promotion, monetary incentives, and public recognition supporting the success of the collaborative whole rather than its individual units. Current metrics often set one unit against another as they compete for donors, visitors, and administrative attention.

Change Agents: A *change agent* can have a positive effect on all stages of collaborations. This trusted individual, department, or program motivates participants to remain focused on the overall vision and provides resources such as ideas, technology, and staff at the appropriate stages.

Mooring: Collaborations need an administrative mooring or a home base for operations, communications, and integration of the collaboration into the institution's mission. Without this mooring, it is difficult for collaborations to situate themselves among other committees or programs, and to be heard among other competing interests.

Adapted from Waibel & Erway (2009)

Manjarrez (2003) add that these four risks can be heightened by a project's complexity and degree of innovativeness. To mitigate these risks, they identify a range of steps that can be taken. These include having a plan that sets out clear goals and objectives; feasible timetables of tasks, deliverables, and respective responsibilities; agreement on recognition; and engaging senior staff in project review and decision-making.

Public-private partnerships, it is worth noting, have their own risks. While much of the financial risk may be taken by the private company, which expects to receive a reward for its investment, the public organization can risk its image

if citizens do not approve of the partnership. In addition, after contracts are signed and a company attains exclusive rights to a project, there is a risk that lack of competition can cause a company to abuse its power or at least reduce the incentive for it to provide innovative solutions for the project, particularly near the end of an agreement (Bovis, 2012). Despite these risks, public-private partnerships can help alleviate cost and workload issues (see the British Newspaper Archive in Box 5.4). Large-scale digitization projects, if carried out in-house, usually require a project manager as well as several staff members. Staff recruitment may be difficult since digitization projects are typically short-term and a pool of qualified individuals may not be available to hire on contract. In addition, once material has been digitized, there is often an additional phase of work that involves establishing a service to make the material available online (Hammond & Davies, 2009). Given these potential difficulties with in-house projects, the risks of public-private partnerships may be justified. According to estimates by Poole (2010), for example, the use of public-private partnerships for digitization is the least expensive, followed by outsourced digitization, and last in-house digitization, which is recognized as the most expensive. For examples of successful partnerships, see Box 5.4.

6.2.5 Managing Outsourcing

Most organizations, including memory institutions, consider some level of outsourcing acceptable.⁹ The general view is that non-core activities (those that do not play a central role in defining an organization or profession) may be outsourced. Examples include facility maintenance, legal services, and accounting services (Cubberley & Skrzyszewski, 1999; Best, 2007). However, difficulty arises in categorizing certain functions as core or non-core. For example, some librarians consider cataloguing a core function, whereas others disagree. Selection and appraisal are generally viewed as core functions that define the professions of librarians, archivists, and museum curators; therefore, many would view the outsourcing of these activities as a form of de-professionalization (Cubberley & Skrzyszewski, 1999). Nonetheless, some memory institutions may occasionally decide to outsource these activities, particularly if they need to accomplish a task quickly (Best, 2007).

Various factors must be considered when deciding whether it would be advantageous for a memory institution to outsource a given activity. Ball (2003) divides these factors into cultural (e.g., whether the activity is central to the relationship of the memory institution with its users); economic (e.g., whether the use of specialist service providers will lead to cost savings); and functional

9 Outsourcing is defined as “the contracting of activities to an outside individual or organisation (which may be another publicly funded body) in place of the use of in-house staff.” See Boss (1999) as cited in Ball and Earl (2002).

(e.g., whether the service is difficult to deliver due to lack of in-house expertise). If all of these factors are taken into account, a core service may still be viewed as a potential candidate for outsourcing if it will be less expensive and simpler to provide in a high-quality manner using a third party.

The Panel notes, however, that outsourcing digital activities can limit the internal capacity of memory institutions to imagine an alternative future and understand what is digitally possible. Without this internal digital expertise, it can therefore be difficult to know what to ask of third parties and to maintain an up-to-date understanding of the rapidly evolving digital frontier.

6.2.6 Managing the Cloud

The cloud is an IT delivery paradigm that enables “convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction” (Mell & Grance, 2011). It allows individual users to take advantage of software without installing it on their personal computers. For organizations with larger-scale needs, cloud computing eliminates or reduces the need to purchase local servers, which may contain storage space that is underused; instead, storage can be purchased on an as-needed basis from cloud providers.

Clouds may be public, private, or a combination of the two (Hu *et al.*, 2011). Whereas public clouds provide services to the general public over the internet and are owned or operated by third-party providers, a private cloud serves the people within an organization, and the material stored within it does not share space with material that is external to the organization (Duranti, 2013).

Advantages of the cloud include lower costs (expenses related to hardware, software, and system maintenance by IT departments can be avoided); scalable and measurable service (customers only pay for the computing resources they consume, which allows for flexibility depending on current needs); and shorter set-up times (in-house development of the same services that a cloud provider can offer typically takes longer) (Julisch & Hall, 2010). By 2020, it is estimated that nearly 40% of the information in the digital universe will be stored or processed in the cloud for at least a part of its lifespan (Gantz & Reinsel, 2012).

Some memory institutions are beginning to view the cloud as a solution to their data storage needs (Mayr, 2011). For those that are using third-party providers to implement their cloud-based infrastructure, several issues arise. These include the level of control that users are allowed to assume, security, and accountability for content.

Level of Control

By employing a third party to manage their computing requirements, users of the cloud do not have control over security and other aspects of content management. Cloud providers may let their customers configure some security aspects such as their password policies; this allows providers to return certain management responsibilities back to their customers (Julisch & Hall, 2010). An additional management issue that presents a challenge in cloud computing is the ability to deal with attaching and maintaining metadata to the information for which a cloud provider is responsible (Ferguson-Boucher & Convery, 2011). Currently, there are no formal policies and guidelines to define how records creators and archives should deal with the initial transfer and preservation of records and metadata in the cloud (Askhoj *et al.*, 2011b). Existing preservation models, such as the OAIS, may be difficult to implement in a cloud environment (Askhoj *et al.*, 2011a). Another major concern is the ability to control the destruction of data. Since cloud providers may only delete the virtual links to a digital record, removal of the information from the server may need to be verified (Ferguson-Boucher & Convery, 2011). At the time of publication, the InterPARES Trust project was developing, with the Object Management Group (OMG, 2014), a "Preservation as a Service for Trust (PaaST)" standard based on a Unified Modeling Language (UML) model that is technologically agnostic and relies on the OAIS model and the InterPARES Chain of Preservation model. This standard will allow for trusted digital preservation in a public cloud environment (Thibodeau, 2014).

Security

Security issues arise when public clouds are used (i.e., when a cloud provider offers cloud services to any paying client). If an in-house IT department delivers its services using a private network, the same security risks are not present (Julisch & Hall, 2010). For individual customers, many cloud-based services previously transmitted and stored user data in an unencrypted form,¹⁰ leaving them vulnerable to hackers. Most cloud providers offered encryption as an option rather than a default setting. In contrast, it has long been standard for banks and other online businesses to use Hypertext Transfer Protocol Secure (HTTPS) encryption to transmit all customer information (Soghoian, 2010). However, practices are changing. In August 2013, Google announced that it would be introducing "server-side" encryption as a default service to its cloud customers (i.e., all data destined for cloud storage will be encrypted following receipt by Google) (Kirk, 2013). Within organizations, opinions vary as to who is responsible for data encryption, with some performing their

10 Encryption is the process of translating a message (plaintext) into an encoded message (ciphertext) to prevent any but the intended recipient from reading the data (PREMIS, 2005).

own encryption before data transfer and others relying on the cloud provider (Ponemon Institute, 2012). Additional potential security threats include service outages initiated by hackers and risk of data misuse by “malicious insiders,” current or former employees of cloud providers with authorized access to an organization’s network (CSA, 2013). There is also the potential for unauthorized users to access private information. These security issues make some archives reluctant to trust the cloud for preservation of our documentary heritage.

Responsibility Versus Accountability

Julisch and Hall (2010) highlight the difference between responsibility and accountability as essential concepts for understanding security in the cloud. While responsibility is merely the “obligation to do something according to certain parameters,” accountability is “ultimate responsibility” for what has or has not been done. In cloud computing, organizations may transfer some responsibility to cloud providers but, ultimately, they are still accountable for their own assets. Although cloud users and cloud providers sign contracts referred to as Service Level Agreements, these contracts generally focus on maintaining data availability rather than integrity or confidentiality. Thus, if data are lost or leaked by a cloud provider, the provider faces little more than a small penalty payment and the potential loss of a customer, leaving the customer to deal with the ramifications. In addition, any protection offered by the cloud provider is revoked if the cloud customer does not ensure that controls such as anti-virus software are in place to protect the resources that it maintains (Julisch & Hall, 2010). The possibility of content loss with few consequences for the cloud provider may be unsettling for members of the archival community.

Overall, deciding whether or not to use cloud-based services is a risk assessment decision. Memory institutions must determine whether the sacrifices (e.g., loss of control) are worth the gains (e.g., cost savings). Even before cloud-based services were an option, however, people trusted many different types of organizations to keep and maintain their records (Duranti, 2013). Furthermore, institutions can choose from many different types of cloud services, some of which allow the user to maintain more control. For example, some providers offer a service in which customers receive the root or administrator password and exclusive control of an unshared server. This grants users full access to the server, down to the hardware level, and allows them to change fundamental features such as the operating system (baremetalcloud, 2014).

6.2.7 Managing Copyrights

Many memory institutions are not the copyright owners for copyright-protected works in their collections. Thus they must consider how copyrights will be managed each time their materials are used for different purposes. Some of their holdings may have entered the public domain due to copyright expiration; memory institutions and the public have the freedom to use these materials in any way they choose. In addition, some of their material is produced in-house, and memory institutions are exploring new ways to provide this material to the public and other institutions.

Management of Copyright-Protected Content Not Owned by an Institution Provisions in the Canadian *Copyright Act* that enable memory institutions to perform certain activities without copyright infringement are discussed in Section 3.1.6. In the absence of special provisions, copyright challenges can often be managed. Management is easier if the challenges are acknowledged at the beginning of a project; otherwise, delays and extra costs may ensue. For example, with respect to copyright in public-private partnerships, Harris (2014) provides a list of practical questions to ask when deciding which copyright permissions to obtain. Some copyright laws may be less restrictive than perceived. For example, a common misconception is that the fair dealing provision never applies when a work is used for profit. However, each fair dealing case is dealt with individually, and while for-profit use may be a factor that the court considers, it does not necessarily mean that the fair dealing defence will be rejected (Harris, 2014). Ultimately, if memory institutions are to be successful in pursuing the new opportunities, a risk management approach that considers copyright risks in balance with the benefits for digital initiatives is important.

Management of Public Domain Content or Content Owned by an Institution

Many memory institutions are exploring different ways to offer access to their content when possible. For example, institutions have the freedom to release digital copies of materials for which copyright has expired, and this situation was taken advantage of by Yale University's libraries, archives, and museums. In 2011, they began providing access to high-resolution digital images of their public domain holdings (The Economist, 2011). Additional ways in which memory institutions can support less restricted use include:

- releasing material to open initiatives such as Flickr and Wikimedia (see Box 5.5);
- creating their own open media platform (e.g., the Netherlands Institute for Sound and Vision's Open Images initiative);
- using CC licences for material they produce in-house (e.g., University of California Santa Cruz Library);

- requiring or encouraging the public to make contributions to participatory projects available under CC (e.g., National Library of Australia’s Click and Flick project, part of the PictureAustralia initiative); and
- releasing metadata (e.g., bibliographic information for library records) under CC licences for material that is still copyright-protected.

(CC, 2014)

Similar to other copyright opportunities, it is important for memory institutions to astutely manage endeavours that involve offering material under less restricted terms. If an institution provides material to another organization, it can benefit more from this collaboration if it ensures that due credit is received.

6.2.8 Developing Human Resources

Successfully adapting to the digital environment is, at base, a test of skills. The risks identified in Table 6.1 related to human resources underscore this challenge, pointing to issues with recruitment and retention of resources, difficulty identifying candidates for evolving library management roles, lack of skills in current staff required for future needs, and addressing the often conservative culture that can inhibit “timely adaptation to changed circumstances” (Michalko *et al.*, 2010). Human resources (HR) issues arise even among those with IT skills. The web manager, who once focused on web design for a memory institution, is now faced with “more complex problems of information organization, access and architecture” (Marty, 2004). The changing roles of web managers and other IT professionals at memory institutions demonstrate how employee skills must evolve to keep pace with evolving business models.

While managing information architecture is becoming a fundamental part of IT professionals’ job descriptions, memory institution library professionals do not always benefit from needed education and training to allow for their effective participation in the digital dimension (Kim *et al.*, 2013). Indeed, as research libraries move to support data-intensive research, and “data scientists,” there will be growing demand for informatics skills that encompass knowledge not only of data management but also of specific research practices, technical standards, and data publication requirements for leading journals (Lyon, 2012). For libraries to provide this level of service, educational institutions need to offer digital curation¹¹ programs that attract a broader range of students with

11 *Digital curation* is a term used by libraries and museums. Archives use the term *digital preservation* to refer to all activities involved in maintaining digital records from the moment of creation during and across different generations of technology over time, irrespective of where they reside. All competences identified in relation to digital curation are also key to digital preservation (DCC, 2014a).

scientific and technical skills and who are willing to engage in lifelong learning. There is also a need to consider accreditation of education programs and certification of professionals to achieve the required expertise (Ross, 2014).

Kim *et al.* (2013) identify a range of digital competencies required by memory institution professionals, which reflect their new responsibilities in general in the digital age. These are presented in Table 6.2.

Table 6.2

Competencies Required of Memory Institution Professionals in the Digital Age

HR Competencies	Description
Communication and Interpersonal Competency	Required for clear and effective communication with a variety of audiences, including users, creators, managers, researchers, and collaborators.
Curating and Preserving Content Competency	Required to understand and carry out a range of activities as defined in the digital curation lifecycle model, including the creation, acquisition, management, representation, access, organization, transformation, and preservation of digital content.
Curation Technologies Competency	Required to identify, use, and develop tools and applications to support digital curation activities. The context of this competency is the IT infrastructure, including the tools and applications deployed to support digital curation.
Environmental Scanning Competency	Required to identify and use resources to stay current and on the leading edge of trends, technologies, and practices that affect professional work and capabilities within the field of digital curation.
Management, Planning, and Evaluation Competency	Required for planning, coordinating, implementing, and assessing programs, projects, and services related to digital curation.
Services Competency	Required to identify, understand, and build services to respond to a community's and/or institution's digital curation needs.
Systems, Models, and Modelling Competency	Required for high-level, abstract thinking about, and critical analysis of, complex systems, workflows, and conceptual models related to digital curation.

Adapted from Kim *et al.* (2013)

Not all of these skills need to be in-house. As noted previously, partnerships, or contracting out, can allow memory institutions to tap into potential skills and tools not available internally. Nonetheless, as Marty (2006) argues in the context of museums, it is important to have an information professional with the “ability to meet user needs by crossing boundaries, assessing information

needs, and serving as user advocates.” For Murphy (2012), professional networks can also be important to address HR issues. He notes a growing trend in the use of knowledge-sharing and skill development networks that support professionals “as they seek to create a new more agile and reflective environment that is conducive to and facilitates the development of emerging practice.”

6.3 NATIONAL FACTORS SUPPORTING THE REALIZATION OF DIGITAL OPPORTUNITIES

Though the capacity to realize digital opportunities is strongly linked to internal factors, a number of countries have benefitted from national or regional initiatives that have either led to the creation of new fully digital memory institutions or have been supportive of existing memory institutions in adapting to new opportunities. This section looks at three areas of external support that influence the collective capacity of memory institutions to respond to the digital era: leadership, legislation, and digital infrastructure.

6.3.1 Leadership Across Memory Institutions

Leadership on digital issues among Canadian memory institutions has in recent years largely been bottom-up, with individual institutions and associations leading on shared digital goals with specific projects that engage others through partnerships. One example is the digital library system, Scholars Portal, which was envisioned and developed under the leadership of the Chief Librarian of the University of Toronto Libraries. By organizing, connecting, and linking the various databases of academic resources, Scholars Portal has become a critical shared technological infrastructure now central to 21 university libraries in Ontario.

In the Panel’s view, this bottom-up leadership is important and addresses a need for flexibility and responsiveness in a rapidly changing digital environment. It is also consistent with the highly fragmented and numerous groups that represent specific sets and subsets of institutions and actors. These are differentiated by geography at various scales (regional, provincial, and national), by type (e.g., archives, libraries), and by sub-type (e.g., professional, technical). As Table 6.3 indicates, there are no associations that represent Canadian memory institutions as a whole and only four that cross over to more than one type to represent both libraries and archives. These associations, however, are specific to certain issues or documents as with, for example, the Association of Canadian Map Libraries and Archives, and can be strong promoters of digital initiatives.

Table 6.3

Canadian Associations by Type of Memory Institution and Region

Type of Association	National	Provincial	Regional	Total
Archives	3	14	1	18
General	1	13	1	15
Professional	1	1		2
Specialist	1			1
Libraries	7	9	2	18
General	2	3	1	6
High Education & Research	3	3	1	7
Professional	1	1		2
Specialist	1	2		3
Libraries & Archives	4			4
Specialist	4			4
Museums	6	13		19
General	1	11		12
Professional	1			1
Specialist	4	2		6
Total	20	36	3	59

Data compiled by the Panel from the following sources: CMA (2014); OCU (2014); ArchivesCanada.ca (n.d.-a); CCA (n.d.-a).

This table shows the diversity of Canadian associations relevant to different types of memory institutions by region. Of the 59 identified, no one association represents the broader category of memory institutions.

These divisions between types of associations are by no means trivial. As Gibson *et al.* (2007) point out, while libraries and museums once had historical and philosophical connections to “common goals of public education and community development,” profound differences now exist in aspects of professional training, terminology, and practices. Whereas libraries tend to be oriented to open access and supportive of freedom of information, with all items made searchable and accessible, museums have tended to emphasize the intellectual property rights of their rare and valuable objects, many of which are secured in storage at any given time, and have seen their role as providing interpretation of the collection (Gibson *et al.*, 2007). However, at a time when users in a digital space are concerned only with finding and accessing digital works irrespective

of where they are sourced from, and when there is a growing number of cross-domain issues related to realizing digital opportunities, these divisions appear not only outdated but also inhibitive. As Waibel and Erway (2009) argue:

Libraries, archives and museums (or LAMs) have each created an orderly world within their respective domains through the power of shared practices and standards. For the purposes of assembling a single body of LAM knowledge, however, those very practices and standards isolate cultural heritage institutions from one another. While the collections LAMs manage remain necessarily fragmented in the real world, potential users of these collections increasingly expect to experience the world of information as accessible from a single online search.

In the Panel's view, this growing overlap in commonalities and collective needs arising from the digital age also points to the importance for top-down leadership that can act on these needs with a single voice. Fostering agreement on common standards or shared infrastructure, for example, cannot be achieved through bottom-up leadership alone.

The potential of top-down leadership is evident from the establishment of Europeana, which stands out globally as an example of a leading memory organization that embraces cultural heritage from all domains, be it archives galleries, museums, or libraries, and leads in responding to digital opportunities and catalyzing change. Europeana was made possible by the European Commission with funding from its Competitiveness and Innovation Framework Program. A flagship project of the EU's i2010 strategy for a European Information Society for growth and jobs, Europeana was held up as an initiative that supported European integration and the knowledge economy and demonstrated Europe's competitive advantage in communication and networking technologies and rich cultural heritage (Valtysson, 2012).

Europeana is also notable as a leader in its own right. In addition to managing a repository of over 30 million cultural items (images, text, audio, and video) from 2,300 European institutions (Europeana, 2013), it is a leader and supporter of European Best Practice Networks that bring together member institutions to respond to opportunities in such areas as developing cloud-based systems, improving access to fashion and television material, and aggregating, enriching, and sharing audio (Europeana, n.d.-a). And, not least, it is a leader and supporter

of a diverse range of technical projects that are developing tools for accessing content interactively, preserving content for the long term, and identifying rights, authors, and publishers in copyright text and images.

To the extent that Canada has shown some top-down leadership in recent years in response to the digital challenge, it has come from LAC. In 2008, LAC launched Thesis Canada in cooperation with Canada's universities to make digitally available approved theses and dissertations. In 2010, LAC played a leadership role in spearheading a national dialogue on the preservation of digital information with the goal of developing a Canadian Digital Information Strategy (CDIS). It was recognized that Canada "lacked a comprehensive approach to guide scientific, cultural and education communities, the public sector, businesses and civil society, in the production, use, sharing and preservation of our vast and growing body of digital information" (CDIS, 2010). The purpose of the CDIS therefore was to ensure that digital information assets would be "created, managed and preserved to ensure that a significant Canadian digital presence and record is available to present and future generations, and that Canada's position in a global digital information economy is enhanced" (CDIS, 2010). The CDIS, however, ultimately did not gain traction as a strategy (Humphrey, 2012).

6.3.2 Legislative and Policy Drivers

Various national governments are supporting the shift to digital through a number of specific legislative and policy changes that are directly and indirectly helping memory institutions adapt to the digital age. Extending legal deposit to encompass all electronic publications is one such change. Whereas Canada in 2004 extended legal deposit to include e-publications and gave LAC the authority to preserve websites of interest (GOC, 2012a), other countries have gone further to include many more online materials. The U.K. government extended their legal deposit legislation in 2013 to include materials published digitally and online, as has France, which modified its *French Heritage Law* in 2006 to officially establish legal deposit of the Web (BnF, 2014). With its mandate to archive any web material that is connected to the United Kingdom, the British Library is also developing the necessary skills and infrastructure to preserve very large data sets that will be central to the future of digital preservation (BL, 2014, n.d.).

There is also work in other countries to change copyright legislation in order to facilitate publishing preservation and publishing collections online. In the United States, an independent study group on Section 108 of the U.S. *Copyright Act* was convened to make recommendations on changes to the library and archive exemption that would reflect a number of realities now facing memory institutions. Among the recommendations made were allowing

contractors to be authorized with the same exceptions as libraries and archives when engaged in outsourced activities, allowing websites to be copied for preservation and access, and making allowances in the *Copyright Act* to facilitate preservation (Gasaway & Rudick, 2008). In the European Union, a review of copyright legislation is also underway as part of its intellectual property strategy, *A Single Market for Intellectual Property Rights*. In support of this review, green papers have been published to initiate conversations about addressing barriers facing libraries and archives that seek to digitally preserve works and make their collections available online, and to distribute audiovisual works. The Canadian *Copyright Act* will next be reviewed in 2017.

As for policy, one area that is supporting memory institutions in the move to digital is e-government strategies. National governments such as the United Kingdom and Australia, in cooperation with their archives, have implemented a digital-by-default policy as part of their national digital strategies. This allows national archives to take the lead for their national institutions by researching the value, skills, and methods for acquiring, preserving, and making accessible digital information. In contrast, Canada's leadership on e-government has diminished relative to other countries. In the early 2000s, Canada was ranked as the top nation in e-government for three consecutive years according to a survey conducted by Accenture (Accenture, 2001, 2003) and was also among the top six nations according to a United Nations e-government survey (UNDESA & CRG, 2003). However, according to the latest international e-government ranking by Waseda University and the United Nations, Canada has fallen out of the top 10 group of nations (United Nations, 2012; Waseda University, 2013).

Government grants are being designed to encourage and fund collaborative projects. For example, the Institute of Museum and Library Services (IMLS, 2014) is a federal grant-making agency that supports non-federal, not-for-profit museums, libraries, and archives in the United States. Since 1998, the IMLS has been funding collaborative digital projects, particularly those that provide innovative models for expansion of public services by libraries and museums (Ray & Choudhury, 2002; Gibson *et al.*, 2007).

6.3.3 Digital Infrastructure

Digital infrastructure that can serve the needs of small memory institutions and cultural and historical groups has been developed in a number of regions and countries. Of note is the Maine Memory Network, a statewide digital museum that provides training, support, and technological infrastructure to aid local heritage organizations to select material and upload, describe, and manage it all through the museum's website (MHS, 2014). As Bromage (2010) describes, the Maine Memory Network "has stimulated extensive historical activity around

the state, and encouraged a wide range of local organizations to engage, participate in, and begin to see themselves as stakeholders in the history of their communities.” He adds that, since it was established in 2001, it has evolved to become a flexible online museum that gives users significant autonomy in sharing their collections. Another example is the previously discussed Encyclopedia of New Zealand, known as Te Ara, which, through its website, acquires pictures and stories of New Zealanders, allowing communities an opportunity to document their particular history (New Zealand Government, 2014a). With such systems in place, cultural communities and small memory institutions are saved the expense of maintaining up-to-date IT systems and acquiring related skills for preserving and making content available.

Despite recognizing the need for a common approach to deal with digital information, Canada does not yet have this type of infrastructure in place. In 2010, amid a wider dialogue initiated by Canada 3.0 one year earlier (Church, 2009), an attempt was made when CARL approached the Canada Foundation for Innovation with an ambitious proposal for a National Collaborative Research Data Infrastructure. With support from Compute Canada, CANARIE, and the Canadian University Council of CIOs, among others, the proposal sought funding for a national network of research data services that comprised multiple tiers, including disciplinary “ingest centres” that researchers would use to ingest and access information about data in the repositories, local storage sites, and centralized larger-scale repositories (CARL, 2012). This initiative too, however, was not funded in the end.

The national dialogue on the need for digital infrastructure began again at the Digital Infrastructure Summits in 2012 and 2013. As a starting point to summit deliberations, it was recognized that Canada lacked a national policy that could provide an integrated planning and funding framework for all elements of a digital infrastructure “ecosystem,” as well as the necessary governance structure among key stakeholders (LCDI, 2013c). Though libraries are acknowledged as a critical partner along with organizations such as CARL and the Canadian Research Knowledge Network, other memory institutions, such as archives, were not, despite having similar needs.

6.4 CONCLUSIONS

Given the diversity in the landscape of Canada's memory institutions and differences in the extent to which they are responding to the many digital opportunities, there is no single pathway to ensure successful adaptation to the ever-changing digital environment. Memory institutions need to decide for themselves the extent to which they can and should make a shift, taking into account a number of factors such as their public mandates, resources, the

nature of their users, and their own internal capacity for change. For those seeking to make a significant shift towards embracing the next level of digital opportunities, the literature suggests that this requires decisions on many internal fronts, from business models to ICT investment to managing rights and HR development. They also need to foster an outward focus on users and potential partners, which will allow them to realize the considerable number of collaboration-based opportunities identified in previous chapters.

Though there is a strong onus on the individual leaders of memory institutions large and small to be digital champions in their respective organizations, evidence from other countries suggests that there is also a top-down role to be played to facilitate the uptake of digital opportunities and common standards. Indeed, memory institutions in Canada are without a single voice that can articulate common needs, be it on important legislation or policy drivers or on the benefits of a common digital infrastructure — all factors that have been identified as being supportive overall in the pursuit of digital opportunities.

7

Conclusions

- **Responding to the Main Charge**
- **Responding to the Sub-Questions**
- **The Benefits of Being Digital**

7 Conclusions

This chapter answers the main question and four sub-questions that comprise the charge to the Panel, drawing on the evidence and analysis presented in Chapters 2 through 6. It concludes with the Panel's final reflections on how memory institutions can best adapt to the rapidly changing heritage environment in the digital age. The Panel humbly notes that some of the findings presented in this report will invariably be out of date soon after publication due to the pace of technological change.

7.1 RESPONDING TO THE MAIN CHARGE

How might memory institutions embrace the opportunities and challenges posed by the changing ways in which Canadians are communicating and working in the digital age?

Acknowledging the digital reality is key for today's memory institutions, the most successful of which will centre their strategic and business planning around digital technologies, services, and opportunities. Anything less will be insufficient in the face of evolving social networking and media, information mobility, the sheer abundance and consumption of new digital material, and, not least, growing public expectations (Chapter 2). Moreover, the potential benefits of doing so are significant. Digital technology and services can revitalize memory institutions as providers of authoritative information, strengthen their relevance to all Canadians, and, through resource-sharing, collaboration, and volunteers, improve operational efficiencies.

Adapting to the digital environment, however, requires institutional risk-taking, innovation, and reallocation of resources to digital priorities (Chapter 6). It also requires an outward focus on the opportunities that have been created through the shift to a more participatory and collaborative culture (Chapters 4 and 5). These cultural shifts are particularly relevant to memory institutions if they are to reposition themselves more centrally within society's information flows and maintain their cultural significance. This evolution also requires that technology be seen more as a mindset and less as a tool, and that the potential disruption that it may bring be welcomed.

Moreover, memory institutions cannot embrace the big opportunities on their own. Collaboration among different types of memory institutions, and with the private sector, is the foundation for the most complex and sophisticated

new services that are now lifting the public's expectations of what is possible (Chapter 5 and Section 6.3). Leadership, both at the institutional and national levels, has also figured prominently in many of the thriving examples profiled in this report (Section 6.3.1).

From an institutional standpoint, the extent to which new opportunities are pursued and digital policies are adopted will ultimately depend on each institution's mandate and capacity for change. Once a policy is adopted, it must be fully integrated into the operations of the institution and supported at the highest levels. It cannot work if reduced to a marginal role (Section 6.1).

In the digital realm, where change is the new constant, what is most important is a mindset of openness and experimentation. Furthermore, the opportunities identified in this report will not solve all of the challenges facing memory institutions in the digital age. Several technical standards, developed in recent years by national and international bodies, strive to address challenges related to the professional practices of archiving both digital and non-digital documentary heritage. Though this report has touched on several of these standards, an evaluation of their usefulness was considered outside of the scope of this assessment.

Digital technology cannot solve all of the existing challenges associated with acquiring, preserving, and accessing documentary heritage. In some cases there are complex copyright issues (Sections 3.1.6, 6.2.7) that need to be recognized and managed. In others, traditional non-digital practices will continue to be the best way forward. Ultimately, our heritage will survive if people continue to cherish it.

7.2 RESPONDING TO THE SUB-QUESTIONS

With the use of new communication technologies, what types of records are being created and how are decisions being documented?

Digital technology is not only changing how we are communicating, consuming, and producing cultural content; it is influencing whether records are being created in the first place and changing the types of records that are being kept (Section 2.2). Websites, videos, emails, Tweets, and other social media channels, instrument and research data, 3D objects, voice recordings, digital art, digital film, videos, and photos exemplify the growing range of digital materials that are currently subject to preservation efforts. It is increasingly important for

governments, which now create volumes of digital records and are themselves users of social media channels, to have digital record systems that can manage social media, especially as they must maintain these records in observance of the law.

Digital records have proliferated, but the Panel also notes recent concerns about a counter-trend whereby such records are automatically destroyed. There are now several popular social media applications that claim to destroy records once viewed. Furthermore, some digital records, such as government records, are simply not created in the first place. This issue has been raised in several reports from provincial privacy commissioners in Canada, which have found evidence of business undertaken verbally, thereby potentially avoiding public disclosure (Section 3.1.5).

How is information being safeguarded for usefulness in the immediate to mid-term across technologies considering the major changes that are occurring?

The digital world has exacerbated the challenge of safeguarding information, especially for governments, which are required by federal and provincial acts to preserve government and ministerial records. Evidence suggests that most federal and provincial government agencies are not safeguarding information for usefulness in the immediate to mid-term (Chapter 1). Acquired material is often stored temporarily until institutions find ways of dealing with it. Those that have the necessary resources will typically migrate materials to non-proprietary (open source) file formats that are accessible using currently available technology. The Panel notes that a cultural change is needed with respect to the importance of recordkeeping and records preservation.

How are memory institutions addressing issues posed by new technologies regarding their traditional roles in assigning value, respecting rights, and assuring authenticity and reliability?

The criteria for **assigning value** to digital and non-digital records are similar; therefore, separate appraisal criteria and methods are not required for digital material. However, many of the challenges relevant to appraising paper records are amplified in the digital world, a reality that is largely caused

by the overwhelming effort required to tackle mass quantities of material (Section 3.1.3). This requires new practices (most likely technologically driven) for implementing the same criteria and methods. This need is compounded by a greater sense of urgency in identifying the digital records to be preserved since, in many cases, appraisal decisions must be made quickly before born digital content either disappears (e.g., Tweets) or becomes inaccessible due to technological obsolescence.

In recognition of the difficulties associated with appraising copious amounts of digital material, a “save everything” approach is sometimes being used (e.g., in web archiving, the preservation of Tweets), though there are several reasons why this approach is not possible in many situations (Section 3.1.2). Where saving everything is not feasible or appropriate, memory institutions may choose to use analytical methods (e.g., CHIN decision trees), which consider various factors that might affect whether a digital object should or can be preserved.

Managing copyright and other areas of intellectual property have long been an important issue for memory institutions (Section 3.1.6). The digital environment has changed and expanded the types of scenarios that copyright must deal with. Global copyright, in particular, plays a much larger and essential role as online distribution requires memory institutions to consider how copyright laws vary internationally. Acquiring permissions to use copyright-protected content for a particular digital project can also be difficult due to the effort needed to locate copyright holders, wherever they may reside. The special provisions for memory institutions in Canada's *Copyright Act* are limited in their ability to deal with a number of issues now common as a result of digital technologies. In addition, the fair dealing defence, which memory institutions can also rely on in some circumstances, is not actually defined in the Act. However, this lack of clarity can actually be harnessed by memory institutions if they are willing to view copyright through a risk management lens. By considering copyright risks in balance with the benefits that digital initiatives bring, memory institutions can best manage the issues in the context of their institutional priorities. Also, when memory institutions produce their own content, they can use it as they wish and allow other institutions to use it beyond the ways that the *Copyright Act* allows without permission. Furthermore, if the copyright for some of their content has expired, memory institutions and the public have the freedom to use these materials in any way they choose.

Assuring reliability requires control of the process of records creation, which should be established by each creator through policies, procedures, and carefully designed workflows and metadata schemas. These help to ensure the making of the right records, by the right person, at the right time, as a matter of course,

in the usual and ordinary development of activity. Records so created are considered by common law to be an exception to the hearsay rule and readily admissible as evidence. Archives have the responsibility of guiding the records creators whose material they are mandated to preserve in establishing creation control and in maintaining and monitoring it (Section 5.3).

Assuring authenticity requires maintaining the metadata that reveal the record's identity and show the integrity of any process of duplication, conversion, or migration carried out to overcome technological obsolescence, as well as the documentation of the system(s) in which the object was created and exists, so that its integrity can be demonstrated and, by inference, the integrity of the records. To ensure that authenticity can still be verified in the event of loss of metadata and documentation, memory institutions can use redundancy, that is, duplication of the acquired material and dispersion in several locations. If memory institutions have no knowledge of the processes of creation, maintenance, and use of material, they can only assure that the records remain as they were when acquired, so they can be declared to be the authentic acquisition (Section 3.1.4).

How can memory institutions remain relevant as a trusted source of continuing information by taking advantage of the collaborative opportunities presented by new social media?

Remaining relevant and being a trusted source of continuing information constitute two important issues that, in the Panel's view, warrant separate consideration. To remain relevant, memory institutions need to ensure that their content is discoverable and usable through popular means, both now and in the future. Today this is through digital devices and search portals like Google; tomorrow, it may be through semantic web applications or something entirely unforeseen. By opening up their content in this way, memory institutions can take important steps in confirming their position as enablers of the creative economy. This report identifies several examples of how this can be done, including outreach activities that would make data more accessible from central access portals, sharing data under open licences so that they can be reused for innovative applications such as smartphone apps, engaging contributors to enhance capacity and content (Sections 4.1 and 4.2), and forming partnerships with private companies and other memory institutions to create unique digital experiences and tools for users. Collaboration is a valuable method for keeping pace with trends and current practices and exploring potential future opportunities (Chapter 5).

To **remain a trusted source of information** is ultimately a management issue. At a time when volunteers are engaged in everything from classifying data to developing new tools, and when outsourcing and cloud services are growing in importance, risks associated with these activities will need to be managed at the institutional level. A key element in remaining trustworthy is the establishment of meaningful relationships with the public (Sections 4.2.4 and 5.5). Memory institutions are beginning to realize that digital projects, which may be national or even international, must establish firm roots in the community in order to succeed. Without the existence of such relationships, citizens may be unaware or uninterested in the new digital tools that memory institutions are working so hard to develop. Building relationships is particularly important for memory institutions that steward Aboriginal cultural heritage and archival records. Meaningful collaborations between Aboriginal communities and museums aimed at increasing digital access to, and engagement with, cultural heritage may play a role in broader efforts at reconciliation.

7.3 THE BENEFITS OF BEING DIGITAL

Let us be clear: society is changing. Mobile devices are globally ubiquitous, and their capabilities continue to advance rapidly. Apps and WiFi, big data coupled with semantic search, and proliferating social media profoundly impact not just our ways of storing information and communicating but also the fundamental nature of social interaction. This is not some passing fad but a meaningful transformation of the social fabric. Traditional business models — in the production and distribution of content, broadcasting, and news and in customer interaction, financial services, and other fields — are being disrupted and transformed. It is a time for creativity and innovation as new business models, structures, and even professions emerge to thrive or fail. It is an exhilarating time. It can also be painfully difficult. And it is unavoidable.

(Barrenechea & Jenkins, 2014)

Transformational, thrive or fail, unavoidable — this vivid portrayal of the digital world is as much a warning as it is a call for leadership. LAC and Canada's other memory institutions, at all levels, can be these leaders. Indeed, their public mandates give them the authority to do so. Tasked with being "a source of enduring knowledge accessible to all, contributing to the cultural, social and

economic advancement of Canada,” LAC can work towards making knowledge truly accessible to all by embracing digital technology. In terms of leadership, digital technology can also help LAC realize its mandate “to facilitate in Canada cooperation among communities involved in the acquisition, preservation and diffusion of knowledge.”

Today’s digital opportunities demand collaboration and information sharing. In lowering barriers to collaboration and enabling more complex services, digital technologies provide memory institutions with an exceptional opportunity to engage a wider set of culturally relevant, but geographically dispersed, communities. Given the potential for digital infrastructure to support the acquisition and preservation of digital heritage, the Panel believes that memory institutions would benefit by becoming more vocal participants in the current national debate on digital infrastructure. Such participation would ensure that the needs of memory institutions and those of the wider public (one that continues to value these institutions) are represented.

Leading digitally is also about keeping pace with expectations. We now expect citizen-centric services in all facets of our lives and that such services seamlessly interact with how we use and access digital material and information every day. Documentary heritage therefore needs to be made digitally discoverable if it is to be used in the shaping of Canada’s culture. Expanding presence in these digital spaces is therefore important for future relevance.

Canada’s memory institutions are historically contingent. LAC’s own roots date back to the establishment of the Dominion Archives in 1872 and of the National Library in 1953. The digital environment of the 21st century is a different time and place. Notwithstanding the recognized limitations and responsibilities of states and institutions, the internet is a worldwide library, and is fast becoming its own archives. In the past, we could read one book at a time. Today, we can use machines to “read” millions of books, or examine thousands of artefacts and records, at once. Alongside these new ways of accessing will come new interpretations and understandings. It is an exciting time, and Canada’s memory institutions have an opportunity to show leadership and shape the way that we remember, now and in the future.

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